VESSEL TRAFFIC CONTROL

HEARING

BEFORE THE

SUBCOMMITTEE ON TRANSPORTATION, AVIATION AND MATERIALS

OF THE

COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY U.S. HOUSE OF REPRESENTATIVES

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VESSEL TRAFFIC CONTROL

MONDAY, JULY 30, 1990

House of Representatives,
Committee on Science, Space, and Technology,
Subcommittee on Transportation, Aviation and Materials,
Washington, D.C.

The Subcommittee met, pursuant to notice, at 9:30 a.m, in New York, New York, Robert Torricelli, Chairman of the Subcommittee, presiding.

Mr. Torricelli. Good morning and welcome to this field hearing of the Subcommittee on Transportation, Aviation and Materials, the Science, Space and Technology Committee, the House of Representatives. I want to welcome you all here this morning and thank you for your participation and interest and to welcome my colleagues.

If you walked out of this room and looked down onto the harbor, you would see heavy traffic moving into the harbor and up the Hudson, East River or perhaps, more importantly, over into Port Newark. What you couldn't see is that something is missing. The Port of New York and New Jersey, the busiest port in the nation, among the busiest in the world, has no way to track all of the vessels that crowd its waterways. For two years, the Port has been virtually blind, operating without a vessel tracking system.

Until 1989, the Coast Guard operated a VTS in New York. The victim of a tight budget, the system was deactivated. Since then, the Port of New York and New Jersey has had no VTS to warn ships of the location and intention of other vessels, or of hazards to navigation. This has gone on despite warnings by the National Transportation Safety Board that an end to the New York VTS would seriously harm navigation safety.

Lack of a VTS is likely to have been a significant factor in the recent accidents that have plagued the port. Each day seems to bring new stories about groundings and collisions that result in oil being poured into the harbor in record amounts. In the Port of Valdez, adequate tracking systems could have prevented the Exxon spill. In the Kill Van Kull, VTS could have prevented numerous accidents, including a 100,000 gallon spill that occurred in 1981.

Now there are plans to reactivate the New York VTS. Yet there is no reason for us to take comfort in this fact if it means a return to the technology of several years ago. That would be no achievement at all.

We live in a time when breakthroughs in electronics and computers have combined to safely track the swarms of aircraft that crowd our skies while neither equipment nor resources can find U.S. ports.

Next year alone the Federal Aviation Administration will spend over $3 billion to maintain the air traffic control system, also in the jurisdiction of this Subcommittee, while the Coast Guard will spend $6.5 million on vessel traffic control.

A commitment to safety and technology has virtually eliminated mid-air collisions, but no similar protection is afforded to ports like New York which moves more petroleum products than any other port in the United States.

Residents of New York and New Jersey are all too familiar with the shipping accidents and oil spills which continue to pollute this Harbor.

Major spills have poured more than one million gallons of oil into the Harbor in the past year alone. Smaller spills occur daily, dumping a constant stream of oil into the waters around New York and New Jersey. With 18 billion gallons of oil arriving in New York Harbor each year, an accident the size of the Exxon Valdez could happen on any given day.

The attitude among the oil industry has been that this is the price we must pay for moving oil and satisfying our energy needs. That price is not only unacceptable, it is unnecessary. Technology is available today that would dramatically improve harbor safety and vessel traffic management.

We cannot continue to operate our ports with antiquated equipment. Both the economic and environmental costs are too great. Other countries, from Egypt to the Netherlands, recognized this reality long ago.

The purpose of this hearing is to determine what kind of safety we can provide for the port of New York and other ports around the country. This is not solely a question of technology.

In terms of vessel traffic, it is also a question of whether command should be shifted from the bridge to a central control tower, as is now being done for aircraft, a question of whether VTS should be phased in, and if so how, a question of which system or combination of systems best meets the needs of the port, but also to alert the public and the press that these accidents, this level of technology is not necessary. The technology exists, the systems can be changed.

After each and every one of recent accidents in this port and around the nation, the press has reported this as if somehow it is inevitable. This will happen because of the amount of oil traffic, because of the complexity of the traffic patterns, without mentioning that changes have been made to reduce the level of safety because of budget constraints. The technology exists elsewhere in the world and is available.

The purpose of this hearing if it has one underlying purpose is to alert the public that there is no such thing as inevitability to these accidents.

In a broader sense, it is also a question of whether ship and barge construction should be improved, whether lightering is helpful or harmful, whether the port is adequately dredged and maintained, and whether vessel inspection is sufficient to prevent unsafe ships from leaving the harbor.

While it is the mandate of this Committee to focus on technology, we are a technology subcommittee, some or all of these other questions will be addressed during our hearing as well.

With that, if I could, also ask for opening comments from a chairman of another subcommittee, the Science Committee, Mr. Scheuer of New York. Mr. Scheuer welcome.

Mr. SCHEUER. I thank my colleague and I welcome you from the other side of the Harbor, Congressman Torricelli, and despite our President's recent remarks on New York City, I would ask you to keep an open mind. Things aren't as bad as they seem.

I also want to commend you on this very, very timely hearing of such critical importance to both New York and New Jersey. In a few days Congress is likely to complete passage of a comprehensive oil spill legislation, breaking and terminating over a decade of deadlock on this issue. They took the shock of Exxon Valdez, that horrifying accident, spilling 11 million gallons of flammable, noxious oil on the shores of Alaska, equal to an area, if it happened in New York, stretching all the way from New York to North Carolina. So, it can happen here.

Now New York is by far the largest single port in the country, far exceeding Valdez and almost exceeding Valdez and Houston, the next largest port. So, it is proper and legitimate that we should be concerned in New York. We have had a half a dozen or more of these accidents in the last 60 or 90 days. They seem to happen with systematic regularity. The combined efforts of man and technology albeit are very inadequate and unsatisfactory and antiquated technologies haven't been able to solve the problem, and it can happen here.

While we on the developed East Coast don't have the abundance and diversity of both wildlife and wilderness areas of Alaska, of course, any such spill here would have devastating consequences.

So, considering that horrific risk, it is just — it boggles my mind Mr. Chairman as it boggles your mind that the New York Harbor vessel tracking service could have been closed down two years ago for lack of funds. Can you imagine what would be the outcry in this country if the F.A.A. decided to do away with air traffic control? We would have chaos in the airways, just as we now have chaos and danger in our waterways, and why we don't have a similar system, similar to our air traffic control system for the dozens of ships the size of this building, if you can imagine it Mr. Chairman, carrying millions of gallons of toxic, flammable chemicals, capable of widespread environment destruction — why we don't have that to guide and organize and control this traffic — it boggles my mind.

We just heard on television this morning from the Coast Guard that they are going to be back in Alaska next spring and that the State of Alaska is going to revisit the site and that Exxon is going to revisit the site. After having spent several billions of dollars, the end is nowhere near in sight and, of course, the situation would be infinitely more complicated for New York if such a devastating event were to take place in this densely occupied and densely traveled area.

So, I am at a loss to understand why we economized how the Coast Guard could have made that decision and I hope they will explain it. To save a couple of $3 or $4 million and to put our great metropolitan area at risk.

As one of the conferees on the oil spill legislation in a meeting of the conferees just last week, I am pleased to announce that we were able to insert a provision that the New York/New Jersey Harbor Port area will be the site of demonstrating the state-of-the-art prevention technologies and mediation technologies, including a vessel traffic system, and the provision that we got in last week, directs the Coast Guard to work with the Port Authority to demonstrate a comprehensive system-wide approach to pollution prevention and pollution mediation—a pollution control, in the horrific event that such a spill takes place.

The bill authorizes $3 million over four years for the project from the Oil Spill Trust Fund. Meanwhile, there is a great deal to be done, and I want to congratulate my Chairman for having arranged this hearing. I do want to announce today, with great pleasure, that Dr. Eugene Guest, the Director of the National Maritime Research Center located on the grounds of the Merchant Marine Academy in King Point in my congressional district will be here. Dr. Guest has testified previously before my Subcommittee on the oil legislation, just completed in conference last week. And the members of my committee agreed with Dr. Guest that preventing oil spills is even more important than cleaning them up after the fact, after they have taken place.

Part of the R&D section of that bill calls for some of the research to be performed at the site that Dr. Guest administers in King Point, to look at areas where accidents might be likely, such as the Plumb Island area off of Long Island Sound. I am delighted that Dr. Guest can be part of this effort to apply the world's technology to keeping our waterways safe and efficient.

I thank you Mr. Chairman.

Mr. TORRICELLI. Thank you Mr. Scheuer, and thank you for joining us and for your leadership on many of these issues. particularly your role in helping to bring effective oil spill legislation before the Congress. Let me take advantage of those comments, however, to state my own real disappointment with some of our colleagues on the oil spill legislation.

We have lived in New Jersey with repeated incidents of oil spills in our waterways because while we term this region the Port of New York, indeed, most of the oil in container traffic entering the port is going to New Jersey. Increasingly it is ending in the waters of our state. Mr. Gallo and I offered to Congress a chance for real protection requiring double hulls and double bottoms on all shipping and barges. Every time there is an accident with one of these ships or barges, local elected officials and members of Congress swarm to the scene to vow that it will never happen again.

While Mr. Gallo and I offered amendments to the legislation so that it never need happen again requiring double bottoms and double hulls, and yet, somehow, while the provision remained for double hulls on ships in fifteen years, provisions for double bottoms to prevent the loss of oil and groundings was eliminated, and barges were exempted, and yet, that is exactly the source of the pollution that is bothering — that is effecting the State of New Jersey and indeed we saw the news from last night with another collision with a barge in Texas, that it has happened once again. So, let me begin, as we are going to have testimony, questioning the activities of the Administration, the industry and others, for what they have not achieved, some of the failures belong to Congress as well and for me it is a source of some considerable frustration.

Mr. Scheuer, but thank you, and thank you for a very positive role that you have played in that process.

Mr. SCHEUER. Thank you Mr. Chairman.

Mr. TORRICELLI. Mr. Rohrabacher of California, would you have a statement you would like to make? I know you are going to get your fill of New York Port problems today, but the considerable problems of San Diego and Long Beach and San Francisco will be heard here today as well.

Mr. ROHRABACHER. Well, first of all Mr. Chairman, I would like to thank you for, (1) energizing this Subcommittee and focusing it on some of the problems that relate directly to the health and safety and functioning of our society and since you have taken over as Chairman, I think that we really have been looking at some issues that mean something to the public and I appreciate your leadership.

I represent a district that encompasses both the Port of Long Beach and Los Angeles, which together represent an area where more international trade flow in and out of those two ports than any other area of the world, including this particular port system I might add.

Mr. TORRICELLI. We were hoping you wouldn't know that.

Mr. ROHRABACHER. But, one other important thing to note is that that also was the port of destination for the Exxon Valdez, and had the Captain of the Exxon Valdez crashed his ship into another vessel closer to his destination, we would have had the black goo stretching for hundreds of miles on our coastline which would have cost the state billions in many ways, not only just wildlife and environmental damage but also in our tourist industry and things such as that, so, to both East Coast and West Coast, this is a vital issue, that I don't think received the attention that it should have received until these recent accidents.

I think there are several solutions, and that you never have a 100 percent solution. First we must minimize our reliance on tankers. As far as I can see, the tankers are inherently more dangerous in terms of a method of receiving our energy supplies then other alternatives. We must look for alternative energy sources that will make us less reliant on tankers. A lot of people who opposed nuclear development back ten, twenty years ago, what happened? We ended up more reliant on tankers which are far more damaging and dangerous to our environment than the development of nuclear energy.

In my own area, we have had offshore oil development off Huntington Beach and Seal Beach for many years, actually, I used to body surf out there for the last twenty years and right in the shadow are offshore oil rigs that have spilled — minimal if any spill from these rigs. Yet, last year, there was a tanker spill which covered our coastline from the American Trader and was a major environmental threat to our area.

So, if we are going to look for making this or making our country reliant on safer ways of getting our energy, well, let's look to alternative energy resources, developing nuclear energy, and actually giving a very honest look to offshore oil development. But, before those things would ever come into play, we have also — besides minimizing our reliance on tankers, we have got to minimize the danger of tanker traffic and that is what this hearing is all about. That will require cooperation between industry and government and when I say industry, I just don't mean the oil industry, I think some of the services that we are talking about, that perhaps the government can't afford to fund by itself these days because of our own budget crunch, perhaps the insurance industry which pays more than anyone else for these tanker traffics, should be mobilized and should be brought in to play in creating a system that works because they are the ones that will benefit by deterring tanker accidents. So, if we can bring about more cooperation between the oil industry and government and the insurance industry in order to meet this problem, I think it is high time we get going on that.

Technology is also a problem. We have not put to use as the Chairman rightfully said, we have not put to use the technology that is available in order to minimize the risk of tanker traffic. I think with the global positioning satellite system that is going up, it offers us new opportunities and I am looking forward to hearing the testimony of the Coast Guard and others about how this system might be put to work in order to prevent these types of tanker accidents.

I would like to note that the satellites are produced in my district in Huntington Beach, at the Rockwell Corporation, and in fact, another company, McDonnell Douglas produces the rockets that put those satellites into orbit.

We also need, besides technology and cooperation, I think what we need is some common sense regulation and again, that is what this hearing is all about, to talk what type of regulation will not hamstring the industry, but will indeed permit the industry, the tanker industry and the oil industry to do what their job is which is to provide energy for the United States of America in the least dangerous way. So, finally, and that is to summarize, we have got to minimize our reliance on tankers, we have got to minimize the danger of tankers if we are going to have a clean and healthy shoreline and we are going to make sure that some of these tanker accidents are deterred.

Again, let me thank the Chairman and congratulate him for the leadership that he is providing to focus Congressional attention and public attention on this vital area.

Mr. TORRICELLI. Thank you Mr. Rohrabacher very much.

For our first panel, Captain John McCarthy, U.S. Coast Guard, accompanied by Captain Larrabee and Commander Schneeweis. Also testifying in our first panel Joseph Birgeles, Manager of Intermodal Planning, The Port Authority of New York and New Jersey.

Captain, Mr. Birgeles, welcome. We appreciate your testimony this morning. As you are undoubtedly now aware, members of Congress and their statements know no lengths. We can proceed forever. We would ask you not to do the same. If you could limit your opening remarks please to five minutes so we can get a chance to make some inquiries of you and engage in a discussion. Your remarks will be entered in their entirety in the record.

Captain, would you like to proceed?

STATEMENTS OF CAPTAIN JOHN E. McCARTY, U.S. COAST GUARD, WASHINGTON, D.C., ACCOMPANIED BY CAPTAIN RICHARD LARRABEE III AND COMMANDER BUD SCHNEEWEIS, AND JOSEPH BIRGELES, MANAGER OF INTERMODAL PLANNING, THE PORT AUTHORITY OF NY AND NJ, NEW YORK, NY

Captain McCarty. Thank you Mr. Chairman. Good morning. I am Captain John McCarty from the Vessel Traffic Services, Special Projects Staff of the Office of Navigation Safety and Waterways Services at Coast Guard headquarters.

I am, as you indicated, joined by Captain Rick Larrabee who is the Captain of the Port of New York and commanding officer of Coast Guard Group New York, and Commander Bud Schneeweis, who is the Commanding Officer of the Coast Guard Vessel Traffic Service, New York.

The Coast Guard appreciates the opportunity to address this committee. I have submitted my opening statement for the record. With your permission, I will briefly summarize it, explaining the mission of VTS and how a VTS accomplishes its mission.

Captain Larrabee and Commander Schneeweis will be able to address issues specifically related to navigation and vessel traffic safety in New York Harbor.

The authority for the Coast Guard to operate vessel traffic services is found in the Ports and Waterways Safety Act of 1973. This Act authorizes the Coast Guard to establish, operate and maintain vessel traffic services in ports and waterways subject to congestion. It also authorizes the Coast Guard to require the carriage of any electronic device necessary for participation in the VTS system.

The purpose of the Act is to establish good order and predictability on our nation's waterways by implementing fundamental waterways management practices. Vessel traffic services is active waterways management. It involves persons external to the vessel that receive, process and communicate information related to the safe navigation of a waterway. When necessary, this information can be output in the form of advisories or directions. However, a VTS never directs the maneuvers of a vessel, with specific course, speed or rudder commands. It is not the purpose of a VTS to navigate the vessel from shore.

A VTS is also the eyes and ears of a port. It is usually the first to hear about or detect unusual activity and it has the communications and the sensors to monitor or manage the response. Aside from obvious contributions to safe navigation, VTS contributes to the safety and security of a waterway in other ways. They relay reports of aids to navigation discrepancies, assist search and rescue craft, manage anchorages and enforce the rules of the roads. A VTS enhances both the safe and efficient movement of commerce in a port.

The hardware by which this mission is accomplished comprises surveillance sensors or receptors, displays or processors, data relay and voice radio or communications. How best to apply technology to meet the particular needs of individual ports requires in depth evaluation of the navigation conditions in each port or waterway.

We are currently conducting a study based on risk analysis which will quantify the extent to which a vessel traffic service could reduce navigational risk in a particular port or waterway. This study will provide a prioritized list of ports and waterways that would benefit from the vessel traffic service.

In closing, I can assure you the Coast Guard is committed to enhancing the safety of navigation in the Port of New York and all of our nation's ports and waterways. We see vessel traffic services as one of several means to attain this goal.

Thank you for the opportunity to address this committee and explain the VTS program. I will be pleased to answer any questions that you may have.

[The prepared statement of Captain McCarty follows:]

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DEPARTMENT OF TRANSPORTATION

U. S. COAST GUARD

STATEMENT OF CAPTAIN JOHN E. MCCARTY

ON THE MISSION AND OPERATION OF VESSEL TRAFFIC SERVICES

HOUSE OF REPRESENTATIVES

COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY

NEW YORK FIELD HEARING

JULY 30, 1990

DEPARTMENT OF TRANSPORTATION
U. S. COAST GUARD
STATEMENT OF CAPTAIN JOHN E. MCCARTY
ON THE MISSION AND OPERATION OF VESSEL TRAFFIC SERVICES
HOUSE OF REPRESENTATIVES
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY
JULY 30, 1990

GOOD MORNING. I AM CAPTAIN JOHN MCCARTY FROM THE VESSEL TRAFFIC SERVICES SPECIAL PROJECT STAFF OF THE OFFICE OF NAVIGATION SAFETY AND WATERWAY SERVICES IN U.S. COAST GUARD HEADQUARTERS. I AM JOINED BY CAPTAIN RICK LARRABEE, CAPTAIN OF THE PORT OF NEW YORK AND COMMANDING OFFICER OF COAST GUARD GROUP, NEW YORK; AND COMMANDER BUD SCHNEEWEIS, COMMANDING OFFICER OF COAST GUARD VESSEL TRAFFIC SERVICE, NEW YORK. THE COAST GUARD APPRECIATES THE OPPORTUNITY TO ADDRESS THIS COMMITTEE. FOR MY PART, I WILL BRIEFLY EXPLAIN THE MISSION OF VTS AND HOW A VTS ACCOMPLISHES THIS MISSION. CAPTAIN LARRABEE AND COMMANDER SCHNEEWEIS ARE ABLE TO ADDRESS ISSUES SPECIFICALLY RELATED TO NAVIGATION AND VESSEL TRAFFIC SAFETY IN NEW YORK HARBOR.

THE AUTHORITY FOR THE COAST GUARD TO OPERATE VESSEL TRAFFIC SERVICES IS FOUND IN THE PORTS AND WATERWAYS SAFETY ACT OF 1973. THIS ACT AUTHORIZES THE COAST GUARD TO "...ESTABLISH, OPERATE AND MAINTAIN VESSEL TRAFFIC SERVICES IN PORTS AND WATERWAYS SUBJECT TO CONGESTION." IT ALSO AUTHORIZES THE COAST GUARD TO REQUIRE THE CARRIAGE OF ANY ELECTRONIC DEVICE NECESSARY FOR PARTICIPATION

IN THE VTS SYSTEM. THE PURPOSE OF THE ACT IS TO ESTABLISH GOOD ORDER AND PREDICTABILITY ON OUR NATION'S WATERWAYS BY IMPLEMENTING FUNDAMENTAL WATERWAYS MANAGEMENT PRACTICES.

VTS IS ACTIVE WATERWAYS MANAGEMENT. IT INVOLVES PERSONS EXTERNAL TO THE VESSEL THAT RECEIVE, PROCESS, AND COMMUNICATE INFORMATION RELATED TO THE SAFE NAVIGATION OF A WATERWAY. WHEN NECESSARY, THIS INFORMATION OUTPUT CAN BE IN THE FORM OF ADVISORIES OR DIRECTIONS. HOWEVER, A VTS NEVER DIRECTS THE MANEUVERS OF A VESSEL WITH SPECIFIC COURSE, SPEED, OR RUDDER COMMANDS. IT IS NOT THE PURPOSE OF A VTS TO NAVIGATE VESSELS FROM THE SHORE.

A VTS IS THE EYES AND EARS OF A PORT. IT IS USUALLY THE FIRST TO HEAR ABOUT OR DETECT UNUSUAL ACTIVITY AND IT HAS THE COMMUNICATIONS AND THE SENSORS TO MONITOR OR MANAGE THE RESPONSE. ASIDE FROM OBVIOUS CONTRIBUTIONS TO SAFE NAVIGATION, VTS CONTRIBUTES TO THE SAFETY AND SECURITY OF A WATERWAY IN OTHER WAYS: THEY RELAY REPORTS OF AIDS TO NAVIGATION DISCREPANCIES, ASSIST SEARCH AND RESCUE CRAFT, MANAGE ANCHORAGES, AND ENFORCE THE RULES OF THE ROAD. A VTS ENHANCES BOTH THE SAFE AND THE EFFICIENT MOVEMENT OF COMMERCE IN A PORT.

THE HARDWARE BY WHICH THIS MISSION IS ACCOMPLISHED COMPRISES SURVEILLANCE SENSORS (RECEPTORS), DISPLAYS (PROCESSORS), DATA RELAY AND VOICE RADIO (COMMUNICATIONS).

MANY SURVEILLANCE SENSORS ARE AVAILABLE OFF THE SHELF OR ARE READILY ADAPTABLE TO VTS APPLICATIONS. PERFORMANCE, ACCURACY, RELIABILITY, MAINTAINABILITY, AND ADAPTABILITY ARE CAREFULLY CONSIDERED WHEN CHOOSING AMONG THE OPTIONS. RADAR, DEPENDENT SURVEILLANCE SYSTEMS AND, TO A LESSER DEGREE, CLOSED CIRCUIT TELEVISION, ARE THE MOST EFFECTIVE MEANS OF PROVIDING TRAFFIC INFORMATION TO THE DECISION MAKERS IN THE VTS.

CLOSED CIRCUIT TELEVISION IS NORMALLY USED ONLY IN APPLICATIONS WHERE RADAR SURVEILLANCE IS IMPRACTICAL. TELEVISION CAMERAS ARE MOST EFFECTIVE IN IDENTIFYING VESSELS AS THEY PASS CHECK POINTS ALONG A NARROW WATERWAY. SUCH CAMERAS HAVE LIMITED APPLICATION IN OPEN WATERWAYS.

RADAR HAS BEEN A STANDARD MARINE SURVEILLANCE TOOL FOR MORE THAN 40 YEARS, AND IS AN INDISPENSABLE SURVEILLANCE MEDIUM IN CERTAIN VTS OPERATIONS. IT REQUIRES NO COOPERATION ON THE PART OF THE VESSELS IT OBSERVES, IT CAN COVER A WIDE AREA, ACQUIRE SMALL CONTACTS, AND ITS SIGNAL CAN BE DISPLAYED IN A VARIETY OF WAYS. ITS DISADVANTAGES ARE THAT IT IS AFFECTED BY WEATHER, IT IS RELATIVELY EXPENSIVE TO INSTALL AND MAINTAIN, AND IT REQUIRES AN EXTENSIVE DATA RELAY NETWORK.

BECAUSE RADAR REQUIRES NO COOPERATION ON THE PART OF VESSELS OR OBJECTS IT OBSERVES, WE CALL IT AN INDEPENDENT SURVEILLANCE SYSTEM. DEPENDENT SURVEILLANCE SYSTEMS, ON THE OTHER HAND, REQUIRE VESSELS TO CARRY POSITION AND IDENTIFICATION REPORTING

EQUIPMENT. THE ABILITY TO SUPPLEMENT INDEPENDENT WITH DEPENDENT SURVEILLANCE WILL BRIDGE THE GAP IN AREAS WHERE CONDITIONS DICTATE SOME FORM OF SURVEILLANCE AND WHERE RADAR COVERAGE IS IMPRACTICAL.

ONCE SURVEILLANCE INFORMATION IS RETURNED TO THE VESSEL TRAFFIC CENTER, IT MUST BE PRESENTED IN A MANNER THAT ALLOWS THE WATCHSTANDER TO READILY ANALYZE IT AND IN TURN PROVIDE MARINERS WITH INFORMATION THEY NEED. MODERN SYSTEMS COMPRISE AN ELECTRONIC CHART THAT DISPLAYS VESSELS OR CONTACTS. THIS DESIGN CAN INCLUDE AUDIBLE AND VISUAL ALARMS TO ALERT WATCHSTANDERS OF IMPENDING COLLISION, EXCESS SPEED, VESSELS OFF-TRACK, VESSELS ENTERING PRE-DESIGNATED SECURITY ZONES, OR ANY DANGEROUS CONDITION THE OPERATOR CHOOSES. THEY ENABLE THE WATCHSTANDER TO DEVOTE MORE ATTENTION TO DIRECT SURVEILLANCE AND PROVIDE BETTER INFORMATION TO MARINERS.

COMMUNICATIONS IS THE MOST IMPORTANT ELEMENT OF A VESSEL TRAFFIC SERVICE. WITHOUT THE ABILITY TO REPORT TO THE MARINER, INFORMATION COLLECTED BY SENSORS AND DISPLAYED ON COMPUTER DRIVEN DECISION SUPPORT SYSTEMS IS MEANINGLESS.

VHF-FM MARINE RADIO IS THE PRIMARY VOICE COMMUNICATIONS MEDIUM IN USE AT VTS'S THROUGHOUT THE WORLD. HOWEVER, THIS EFFICIENT AND INEXPENSIVE NETWORK IS BECOMING CROWDED WITH THE INCREASING AMOUNTS OF INFORMATION REQUIRED FOR VESSEL AND PORT OPERATIONS. SATELLITE COMMUNICATION IS BEING CONSIDERED AS AN ALTERNATIVE, BUT THE NEED FOR VOICE TRANSMISSIONS WILL ALWAYS REMAIN.

HOW BEST TO APPLY THIS TECHNOLOGY TO MEET THE PARTICULAR NEEDS OF INDIVIDUAL PORTS REQUIRES IN-DEPTH EVALUATION OF THE NAVIGATION CONDITIONS IN EACH PORT OR WATERWAY. IN 1973, THE COAST GUARD COMMISSIONED A PORT NEEDS STUDY TO PRIORITIZE SELECTED U.S. PORTS ACCORDING TO THE DEGREE TO WHICH A GIVEN LEVEL OF WATERWAYS MANAGEMENT COULD REDUCE THE NUMBER OF ACCIDENTS. THE 1973 STUDY HAS BECOME OUTDATED IN TERMS OF ITS STATISTICAL DATABASE AND AVAILABLE HARDWARE SOLUTIONS.

THE 1973 STUDY WAS BASED ON ACCIDENT ANALYSES. A CURRENT EFFORT, BASED ON RISK ANALYSIS, WILL ATTEMPT TO QUANTIFY THE EXTENT TO WHICH A VTS COULD REDUCE NAVIGATIONAL RISK IN A PORT OR WATERWAY. THE NEW STUDY WILL PROVIDE A PRIORITIZED LIST OF PORTS AND WATERWAYS THAT WOULD DERIVE THE MOST BENEFIT FROM A GIVEN LEVEL OF VESSEL TRAFFIC SERVICE. THE HARDWARE LEVELS BEING CONSIDERED IN THE NEW STUDY ARE:

1. VESSEL MOVEMENT REPORTING SYSTEM,
2. SIMPLE SURVEILLANCE,
3. AUTOMATED COLLISION AVOIDANCE SYSTEMS, AND
4. DEPENDENT SURVEILLANCE

IN CLOSING, I CAN ASSURE YOU THE COAST IS GUARD IS COMMITTED TO ENHANCING THE SAFETY OF NAVIGATION IN THE PORT OF NEW YORK AND ALL OUR NATION'S PORTS AND WATERWAYS. WE SEE VESSEL TRAFFIC SERVICES AS ONE OF SEVERAL MEANS TO ATTAIN TO THIS GOAL. THANK YOU FOR THE OPPORTUNITY TO ADDRESS THIS COMMITTEE AND EXPLAIN THE VTS PROGRAM. I WILL BE PLEASED TO ANSWER ANY QUESTIONS YOU MAY HAVE.

BIOGRAPHICAL SKETCH

CAPTAIN JOHN E. MC CARTY, A NATIVE OF BROOKLYN, NEW YORK GRADUATED FROM THE U. S. COAST GUARD ACADEMY IN 1960 AND REPORTED ON BOARD THE COAST GUARD CUTTER COOS BAY FOR A TWO YEAR TOUR. HIS NEXT ASSIGNMENT WAS AS ASSISTANT ENGINEER OF THE CUTTER COOK INLET IN PORTLAND, MAINE. IN 1967, CAPTAIN MC CARTY ATTENDED THE U. S. NAVAL POSTGRADUATE SCHOOL WHERE HE EARNED AN M.S. IN MANAGEMENT. HE THEN SERVED IN HEADQUARTERS AS PLANNING OFFICER FOR THE NEWLY ESTABLISHED OFFICE OF RESEARCH AND DEVELOPMENT. FOLLOWING THIS TOUR, HE SERVED ON THE PRE-COMMISSIONING DETAIL AND AS COMPTROLLER AT THE COAST GUARD SUPPORT CENTER IN KODIAK, ALASKA. FROM 1973 TO 1976, CAPT MC CARTY SERVED AS COMPTROLLER IN THE NINTH DISTRICT FOLLOWED BY ASSIGNMENTS AS PLANNING OFFICER IN THE SEVENTH DISTRICT AND COMPTROLLER OF THE FIRST DISTRICT. IN 1983 CAPTAIN MC CARTY REPORTED TO HEADQUARTERS FIRST AS CHIEF OF THE CONTRACT AND PROCUREMENT DIVISION AND THEN AS DEPUTY COMPTROLLER OF THE COAST GUARD. IN JUNE 1989 HE REPORTED TO HIS PRESENT POSITION AS PROGRAM MANAGER FOR THE VESSEL TRAFFIC SERVICES PROGRAM.

AMONG HIS DECORATIONS ARE THE MERITORIOUS SERVICE MEDAL WITH GOLD STAR, THE COAST GUARD COMMENDATION MEDAL, AND THE COAST GUARD ACHIEVEMENT MEDAL.

CAPTAIN MC CARTY IS MARRIED TO THE FORMER EDMEA SILVEIRA OF RIO DE JANEIRO, BRAZIL. THEY HAVE THREE CHILDREN: JOHN, LIVING IN LOS ANGELES, CALIFORNIA; ROBERT, COMMANDING OFFICER OF THE COAST GUARD CUTTER CUTTYHUNK; AND ANNE WHO IS IN HER SENIOR YEAR AT FLORIDA STATE UNIVERSITY IN TALLAHASSEE, FLORIDA.

Mr. TORRICELLI. Thank you Captain. Mr. Birgeles, please proceed.

Mr. BIRGELES. Good morning Mr. Chairman. My name is Joseph J. Birgeles and I am the Manager of External Affairs for the Port Authority of New York and New Jersey. I would like to thank the Subcommittee for the opportunity to speak on this important subject of vessel traffic control and port safety in the Port of New York and New Jersey. We commend you Mr. Chairman for holding this hearing and look forward to your findings and recommendations.

We and others of the regions' delegation have been very active on the issue of oil spills which in part prompts this hearing. You know as we do that while this Harbor does not have the dramatic and pristine features of the Alaska Coast, it does have a great uniqueness such as the Palisades of your district and the environmental critical features deserving no less attention and concern.

The region is fortunate that the petroleum trade in the Port of New York and New Jersey is very large. It is important to maintain this considerable commerce for the region. In 1989, approximately 36.5 million long tons of petroleum import products were transported by vessel in the port. Over 65 percent of the port's total tonnage consists of petroleum and petroleum products. Despite these considerable volumes, there is no reason why safe transportation cannot take place. All it takes is sound equipment, good judgment and planning, capable crews, a ready response, respect for the environment, and care. Only high standards of operation in the port are acceptable.

Important too is the economic consequences of spills. More than 5,000 ocean vessels called at the port last year, requiring safe access of the waterways. Approximately 1,500 of those vessels are tankers which generally sail to the ports petroleum terminals located on the Arthur Kill Channel. The Arthur Kill connects with the busy Kill Van Kull that provides access for some 50,000 vessel movements annually. Such heavy traffic on a major waterway requires strict consideration of navigational safety including matters such as channel dredging, channel deepening, crew training, pollution response time, vessel traffic systems, and navigational aids. Every time a spill occurs in a channel as close to traffic, there is the potential and the often real loss of business to the port. The last spill that we had cost the port over — a day and a half the channel was closed. It was estimated at $1.5 million.

Ships on a tight schedule do not have the luxury of sitting at anchor until the channel is reopened. Oil spill liability legislations pending in New York, New Jersey and Washington will strengthen the law as it regards pollution and the marine environment.

The various legislation initiatives and attention being given to this area certainly provide greater incentive for the care and operation of the facilities and the vessels for the prevention of oil spills. The states are proposing various measures that will require deployment of containment booms, improved oil transfer through pipelines, tanker avoidance zones, and establishment of a petroleum bearing vessel advisory commission. The Port Authority is prepared to assist that proposed commission and we look forward to its formation.

I would also like to suggest a few ideas and make recommendations that we feel will assist in providing greater vessel safety in the port.

Some are not within the jurisdiction of this Subcommittee, but are worth noting to give you the full measure of what is needed to provide for adequate port infrastructure and harbor safety.

The Port Authority has long been an advocate and supporter of the Coast Guard's vessel traffic service and published the first report in the early 1970s recommending establishment of the VTS system in the port. For your information, I am Vice Chairman of the U.S. Coast Guard New York Harbor Traffic Management Advisory Committee. Also, Bill Peterson is Chairman of the Committee and the President of the Sandy Hook Pilot's Association. He is present here today if you would have some questions for him. Due to budget austerity measures in 1989, the Coast Guard pledges a plan for approximately $105 million. That reduction seriously effected many areas of the Coast Guard's operation. Of particular concern was the closure of the vessel traffic service whose critical function is to warn vessels of navigational hazards and the related positions of other ships.

When the program was in operation, on average, three maritime incidences per month, which is incidences by the VTS system, are vessel collisions, grounding, rammings and pollution events that the service was credited with preventing, so it was a going operation. Now, with the re-establishment of VTS and for which we thank the New York and New Jersey Congressional delegation members, the Coast Guard intends to start service in phases. Phase I will commence in early December of this year and provide coverage in the upper Bay and the Kill Van Kull and Newark Bay. The next two phases which we understand estimated at more than $5 million per phase has been budgeted by the Coast Guard in 1992. I am pleased to note that the Senate Appropriations Committee has approved $6.9 million for Phase II funding in FY 1991. We hope that this will be sustained and that this kind of support from Congress that is essential to realizing improvements to port safety sooner than later.

In addition to the heavy traffic, the prime navigational hazards in the port consist of narrow channels, strong currents, obscure channel bends. We believe, and it is very important, that the Coast Guard re-evaluate the present navigational aids on all waterways in the Harbor. Congress should act to ensure that such an evaluation takes place. There may be equipment presently in use that is in need of replacement or modernization.

We were very pleased to learn last week that through the efforts of this Committee's Chairman, Robert Roe, the oil spill legislation was amended to include a demonstration project for the cooperative work between the Coast Guard and the Port Authority to utilize navigation and other technologies and means to provide for greater safety and spill response in the port. Over all, this Committee should act to ensure that the technology that is essential to navigational safety in the ports infrastructure not be permitted to stagnate.

We have seen how advances can be made, for example, in the air traffic control area. The maritime sector deserves no less. Similar, we should not be satisfied with oil spill response techniques that have been practiced for decades. If those techniques are still effective, fine, but this Committee should advance the research and development of new techniques. There may be no better example than the promising use of biology in cleaning up oil spills. The recent test of oil eating microbes on the Coast of Galvaston seems to have had some effect. I hope that this area of research does not go wanting for support.

We also suggest that Congress request that the Army Corp. of Engineers study the ports federal channel system as a total system with a view towards channel widening, deepening and easing of channel bends. When the federal channel system was constructed, it was done in segments by waterways and not as a total system. The use of the computer aided operations research facility at Kings Point could provide computer modeling and simulation of vessel movements on various tides, winds, currents in the ports waterways. Data so generated could be used to help move safe navigation by providing new channel designs and placements of aids to navigation.

Mr. Chairman, the Coast Guard and ourselves have recently just completed an $80,000 maneuvering study just for one small section of the waterway to ensure vessel safety during the construction of the deepening of the Kill Van Kull channel program.

The ports anchorages are also a critical resource. Presently there exists three anchorages in the lower and upper bays that accommodate ocean going general cargo vessels and tankers. There is no additional capacity within these anchorages to accommodate today's modern vessels. The anchorages were designed by the Corp. of Engineers in the early 1960s for a vessel averaging 525 feet in overall length with a draft of 30 feet. Today's modern ships are 1,000 feet long with drafts of 40 feet, therefore requiring additional space and depth beyond that allowed in the original anchorage design.

If our bi-state port is to remain productive and safe, it must modernize to accommodate today's vessels deeper and to increase space for the Red Hook anchorage flats in the upper bay, would afford a safe anchorage for tankers to lighter petroleum products to barges so that they would reduce their draft requirements prior to proceeding to the discharge terminals in the Kill Van Kull and the Arthur Kill waterways.

We have requested that the Appropriations Committee appropriate $500,000 for the Corp. to begin its study for the Red Hook flats anchorage.

Harbor and port improvements are essential to safe navigation and trade growth in the region. The Port Authority has committed a half a billion dollars over the next five years to improving the aspects of the port under our control. There is also a federal side of the port improvements that must happen.

The Harbor projects that we have discussed today are only essential for safe navigation, but they also will help the port compete for new business in the years to come.

Thank you for this opportunity to present our views on this important subject which is critical to the future of the Port of New York and New Jersey. Thank you Mr. Chairman.

[The prepared statement of Mr. Birgeles follows:]

STATEMENT OF JOSEPH J. BIRGELES
MANAGER, EXTERNAL AFFAIRS
THE PORT AUTHORITY OF NEW YORK AND NEW JERSEY
BEFORE
THE SUBCOMMITTEE ON TRANSPORTATION, AVIATION, AND MATERIALS
ON VESSEL TRAFFIC CONTROL
NEW YORK CITY, NEW YORK

JULY 30, 1990

GOOD MORNING. MY NAME IS JOSEPH J. BIRGELES, MANAGER OF EXTERNAL AFFAIRS, PORT DEPARTMENT OF THE PORT AUTHORITY OF NEW YORK AND NEW JERSEY. I WOULD LIKE TO THANK THE SUBCOMMITTEE FOR THE OPPORTUNITY TO SPEAK ON THE IMPORTANT SUBJECT OF VESSEL TRAFFIC CONTROL AND PORT SAFETY IN THE NEW YORK AND NEW JERSEY HARBOR. WE COMMEND YOU, MR. CHAIRMAN, FOR HOLDING THIS HEARING AND LOOK FORWARD TO YOUR FINDINGS AND RECOMMENDATIONS. YOU AND OTHERS OF THE REGION'S DELEGATION HAVE BEEN VERY ACTIVE ON THE ISSUE OF OIL SPILLS, WHICH IN PART PROMPTS THIS HEARING. YOU KNOW AS DO WE THAT WHILE THIS HARBOR DOES NOT HAVE THE DRAMATIC AND PRISTINE FEATURES OF THE ALASKA COAST, IT DOES HAVE GREAT UNIQUENESS - SUCH AS THE PALLISADES OF YOUR DISTRICT - AND ENVIRONMENTALLY CRITICAL FEATURES DESERVING NO LESS ATTENTION AND CONCERN.

THE PORT AUTHORITY IS A BISTATE, FINANCIALLY SELF-SUPPORTING PUBLIC AGENCY WITH RESPONSIBILITY FOR A RANGE OF TRANSPORTATION ACTIVITIES AND COMMERCIAL FACILITIES AND PROGRAMS IN THE NEW YORK-NEW JERSEY METROPOLITAN REGION. IT WAS ESTABLISHED ALMOST 70 YEARS AGO BY A COMPACT BETWEEN THE STATES OF NEW YORK AND NEW JERSEY TO DEVELOP TRANSPORTATION FACILITIES AND TO PROMOTE THE COMMERCE OF THE PORT REGION. IN FACT, THE DEVELOPMENT OF THE

SHIPPING INDUSTRY, AND THE MOVEMENT OF GOODS THROUGH THE PORT DISTRICT, IS THE MANDATE THAT LED TO THE ESTABLISHMENT OF THE PORT AUTHORITY. THE MARITIME INDUSTRY GENERATES IMPORTANT ECONOMIC BENEFITS FOR THE REGION. THE MOST RECENT STATISTICS INDICATE THAT THE NEW YORK-NEW JERSEY PORT INDUSTRY GENERATES $16.8 BILLION ANNUALLY IN ECONOMIC ACTIVITY AND MORE THAN 180,000 JOBS.

THE PORT, ON BOTH SIDES OF THE HUDSON RIVER, IS A REGIONAL ASSET WHICH HOLDS UNLIMITED POTENTIAL FOR GROWTH. AS YOU KNOW, PORTS IN THE UNITED STATES OPERATE IN A VERY COMPETITIVE ENVIRONMENT. CHANGES IN SHIPPING PATTERNS, MODES OF TRANSPORTATION, TECHNOLOGY, AND HARBOR NAVIGATION IMPROVEMENTS AND SAFETY ALL HAVE BEARING ON THE COMPETITIVE POSITION OF PORTS VIS-A-VIS EACHOTHER. THUS, THE NAVIGATION NEEDS THAT I WILL DISCUSS TODAY WILL SERVE TO ASSIST IN KEEPING THE NEW YORK-NEW JERSEY PORT COMPETITIVE BY PROVIDING AN EFFICIENT AND SAFE HARBOR, AND IN TURN CAN GENERATE OPPORTUNITIES FOR BUSINESS EXPANSION. WE ARE PROUD TO NOTE THAT 1989 WAS THE PORT'S THIRD HIGHEST TONNAGE YEAR, SURPASSED ONLY BY 1985 AND 1986. FOREIGN OCEANBORNE GENERAL CARGO VOLUME ROSE 9.8 PERCENT TO APPROXIMATELY 13.3 MILLION LONG TONS, AN INCREASE OF 1.2 MILLION LONG TONS OVER 1988. THE VALUE OF THIS CARGO WAS $44.3 BILLION, UP 1.8 PERCENT FROM THE $43.5 BILLION HANDLED IN 1988.

THE REGION IS FORTUNATE THAT THE PETROLEUM TRADE IN THE PORT OF NEW YORK AND NEW JERSEY IS VERY LARGE. IT IS IMPORTANT TO MAINTAIN THIS CONSIDERABLE COMMERCE FOR THE REGION. IN 1989, APPROXIMATELY 36.5 MILLION LONG TONS OF PETROLEUM IMPORT PRODUCTS WERE TRANSPORTED BY VESSELS IN THE PORT. OVER 65 PERCENT OF THE PORT'S TOTAL TONNAGE CONSISTS OF PETROLEUM AND PETROLEUM PRODUCTS. DESPITE THESE CONSIDERABLE VOLUMES, THERE IS NO REASON

WHY SAFE TRANSPORTATION CANNOT TAKE PLACE. ALL IT TAKES IS SOUND EQUIPMENT, GOOD JUDGMENT AND PLANNING, CAPABLE CREWS, A READY RESPONSE, RESPECT FOR THE ENVIRONMENT AND CARE. ONLY HIGH STANDARDS OF OPERATION IN THE PORT ARE ACCEPTABLE.

WE ARE VERY CONCERNED WITH THE RECENT OIL SPILL INCIDENTS AND THEIR ENVIRONMENTAL EFFECT. WHILE THE PORT WATERS AND SEDIMENTS BEAR WITNESS TO THE REGION'S URBAN INDUSTRIAL HISTORY, THE HARBOR AND ALL OF THE HUDSON-RARITAN ESTUARY ARE A VITAL AND VALUABLE NATURAL RESOURCE. THAT THERE IS POLLUTION EXISTING DOES NOT DIMINISH THE CONCERN WITH EACH SPILL THAT OCCURS.

IMPORTANT, TOO, IS THE ECONOMIC CONSEQUENCE OF SPILLS. MORE THAN 5,000 OCEAN VESSELS CALLED AT THE PORT LAST YEAR, REQUIRING SAFE ACCESS ON THE WATERWAYS. APPROXIMATELY 1,500 OF THOSE VESSELS ARE TANKERS WHICH GENERALLY SAIL TO THE PORT'S PETROLEUM TERMINALS LOCATED ON THE ARTHUR KILL CHANNEL. THE ARTHUR KILL CONNECTS WITH THE BUSY KILL VAN KULL CHANNEL THAT PROVIDES ACCESS FOR SOME 50,000 VESSEL MOVEMENTS ANNUALLY. SUCH HEAVY TRAFFIC ON A MAJOR WATERWAY REQUIRES STRICT CONSIDERATION OF NAVIGATIONAL SAFETY INCLUDING MATTERS SUCH AS CHANNEL DREDGING, CHANNEL DEEPENING, CREW TRAINING, POLLUTION RESPONSE TIME, VESSEL TRAFFIC SYSTEMS, AND NAVIGATIONAL AIDS. EVERY TIME A SPILL OCCURS AND A CHANNEL IS CLOSED TO TRAFFIC, THERE IS THE POTENTIAL, AND OFTEN REAL, LOSS OF BUSINESS TO THE PORT. SHIPS ON A TIGHT SCHEDULE DO NOT HAVE THE LUXURY OF SITTING AT ANCHOR UNTIL THE CHANNEL IS REOPENED.

OIL SPILL LIABILITY LEGISLATION PENDING IN NEW YORK, NEW JERSEY AND WASHINGTON WILL STRENGTHEN THE LAW AS IT REGARDS POLLUTION AND THE MARINE ENVIRONMENT. THE VARIOUS LEGISLATIVE INITIATIVES AND ATTENTION BEING GIVEN TO THIS AREA CERTAINLY PROVIDES GREATER INCENTIVE FOR CARE IN THE OPERATION OF

FACILITIES AND VESSELS AND FOR THE PREVENTION OF OIL SPILLS. THE STATES ARE ALSO PROPOSING VARIOUS MEASURES THAT WILL REQUIRE DEPLOYMENT OF CONTAINMENT BOOMS; IMPROVE OIL TRANSFERS THROUGH PIPELINES AND TANKER AVOIDANCE ZONES, AND; ESTABLISH A PETROLEUM-BEARING VESSEL ADVISORY COMMISSION. THE PORT AUTHORITY IS PREPARED TO ASSIST THE PROPOSED COMMISSION AND WE LOOK FORWARD TO ITS FORMATION.

I WOULD LIKE TO SUGGEST A FEW IDEAS AND MAKE RECOMMENDATIONS THAT WE FEEL WILL ASSIST IN PROVIDING GREATER VESSEL SAFETY IN THE PORT. SOME ARE NOT WITHIN THE JURISDICTION OF THIS SUBCOMMITTEE BUT ARE WORTH NOTING TO GIVE YOU THE FULL MEASURE OF WHAT IS NEEDED TO PROVIDE FOR ADEQUATE PORT INFRATRUCTURE AND HARBOR SAFETY.

THE PORT AUTHORITY HAS BEEN AN ADVOCATE AND SUPPORTER OF THE COAST GUARD'S VESSEL TRAFFIC SERVICE, NEW YORK (VTS) AND PUBLISHED THE FIRST REPORT IN THE EARLY 70'S RECOMMENDING ESTABLISHMENT OF A VTS SYSTEM IN THE PORT. FOR YOUR INFORMATION, I AM VICE CHAIRMAN OF THE U.S. COAST GUARD NEW YORK HARBOR TRAFFIC MANAGEMENT ADVISORY COMMITTEE. DUE TO BUDGET AUSTERITY MEASURES IN 1988, THE COAST GUARD'S BUDGET WAS SLASHED APPROXIMATELY $105 MILLION. THAT REDUCTION SERIOUSLY AFFECTED MANY AREAS OF THE COAST GUARD'S OPERATION. OF PARTICULAR LOCAL CONCERN WAS THE CLOSURE OF THE VESSEL TRAFFIC SERVICE WHOSE CRITICAL FUNCTION IS TO WARN VESSELS OF NAVIGATION HAZARDS AND THE RELATIVE POSITIONS OF OTHER SHIPS.

WHEN THE PROGRAM WAS IN OPERATION THERE WAS, ON AVERAGE, THREE MARITIME INCIDENTS PER MONTH (VESSEL COLLISIONS, GROUNDINGS, RAMMINGS AND POLLUTION EVENTS) THAT THE SERVICE WAS CREDITED WITH PREVENTING. NOW WITH THE RE-ESTABLISHMENT OF VTS, FOR WHICH WE THANK NEW JERSEY AND NEW YORK

CONGRESSIONAL DELEGATION MEMBERS, THE COAST GUARD INTENDS TO START SERVICE IN PHASES. PHASE ONE WILL COMMENCE IN EARLY DECEMBER OF THIS YEAR AND PROVIDE COVERAGE IN UPPER NEW YORK BAY, THE KILL VAN KULL AND NEWARK BAY. THE NEXT TWO PHASES REQUIRE MORE THAN $5 MILLION PER PHASE WITH FUNDING BEING REQUESTED BY THE COAST GUARD FOR FISCAL YEAR 1992. I AM PLEASED TO NOTE THAT THE SENATE APPROPRIATIONS COMMITTEE HAS APPROVED $6.9 MILLION FOR PHASE TWO FUNDING IN FY 1991. WE HOPE THAT IT WILL BE SUSTAINED. IT IS THAT KIND OF SUPPORT FROM CONGRESS THAT IS ESSENTIAL TO REALIZING IMPROVEMENTS TO PORT SAFETY SOONER THAN LATER.

IN ADDITION TO HEAVY SHIP TRAFFIC, THE PRIME NAVIGATIONAL HAZARDS IN THE PORT CONSIST OF NARROW CHANNELS, STRONG TIDAL CURRENTS, AND OBSCURED CHANNEL BENDS. WE BELIEVE IT TO BE VERY IMPORTANT THAT THE COAST GUARD RE-EVALUATE PRESENT NAVIGATIONAL AIDS ON ALL WATERWAYS IN THE HARBOR. CONGRESS SHOULD ACT TO ENSURE THAT SUCH AN EVALUATION TAKE PLACE. THERE MAY WELL BE EQUIPMENT PRESENTLY IN USE THAT IS IN NEED OF REPLACEMENT OR MODERNIZATION. WE WERE VERY PLEASED TO LEARN LAST WEEK THAT THROUGH THE EFFORTS OF THIS COMMITTEEE'S CHAIRMAN, ROBERT ROE, THE OIL SPILL LEGISLATION WAS AMENDED TO INCLUDE A DEMONSTRATION PROJECT FOR COOPERATIVE WORK BETWEEN THE COAST GUARD AND THE PORT AUTHORITY TO UTILIZE NAVIGATIONAL AND OTHER TECHNOLOGIES AND MEANS TO PROVIDE FOR GREATER SAFETY AND SPILL RESPONSE IN THE PORT.

OVERALL, THIS COMMITTEE SHOULD ACT TO ENSURE THAT THE TECHNOLOGY THAT IS ESSENTIAL TO NAVIGATION SAFETY AND A PORT'S INFRASTRUCTURE NOT BE PERMITTED TO STAGNATE. WE HAVE SEEN HOW ADVANCES CAN BE MADE, FOR EXAMPLE, IN AIR TRAFFIC CONTROL. THE MARITIME SECTOR DESERVES NO LESS. SIMILARLY, WE SHOULD NOT BE SATISFIED WITH OIL SPILL RESPONSE TECHNIQUES THAT HAVE BEEN

PRACTICED FOR DECADES. IF THOSE TECHNIQUES ARE STILL EFFECTIVE, FINE. BUT THIS COMMITTEE SHOULD ADVANCE THE RESEARCH AND DEVELOPMENT OF NEW TECHNIQUES. THERE MAY BE NO BETTER EXAMPLE THAN THE PROMISING USE OF BIOLOGY IN CLEANING UP OIL. THE RECENT TEST OF OIL-EATING MICROBES OFF THE COAST OF GALVESTON SEEMS TO HAVE HAD SOME EFFECT. I HOPE THAT THIS AREA OF RESEARCH DOES NOT GO WANTING FOR SUPPORT.

WE ALSO SUGGEST THAT CONGRESS REQUEST THE ARMY CORPS OF ENGINEERS TO STUDY THE PORT'S FEDERAL CHANNEL SYSTEM AS A TOTAL SYSTEM WITH A VIEW TOWARDS CHANNEL WIDENING, DEEPENING, AND EASING OF CHANNEL BENDS. WHEN THE FEDERAL CHANNEL SYSTEM WAS CONSTRUCTED IT WAS DONE IN SEGMENTS BY WATERWAYS AND NOT AS A TOTAL SYSTEM. THE USE OF THE COMPUTER AIDED OPERATIONS RESEARCH FACILITY (CAORF) AT KINGS POINT COULD PROVIDE COMPUTER MODELS AND SIMULATION OF VESSEL MOVEMENTS ON VARIOUS TIDES, WINDS AND CURRENTS IN THE PORT'S WATERWAYS. DATA GENERATED CAN BE USED TO HELP MOVE SAFE NAVIGATION BY PROVIDING NEW CHANNEL DESIGNS AND PLACEMENT OF AIDS FOR NAVIGATION.

THE PORT'S ANCHORAGES ARE ALSO CRITICAL RESOURCES. PRESENTLY, THERE EXIST THREE ANCHORAGE AREAS IN THE LOWER AND UPPER NEW YORK BAYS THAT ACCOMMODATE OCEAN GOING GENERAL CARGO SHIPS AND TANKERS. THERE IS NO ADDITIONAL CAPACITY WITHIN THESE ANCHORAGES TO ACCOMMODATE TODAY'S MODERN VESSELS. THE ANCHORAGES WERE DESIGNED BY THE CORPS OF ENGINEERS IN THE EARLY 1960'S FOR A VESSEL AVERAGING 525 FEET IN OVERALL LENGTH WITH A DRAFT OF 30 FEET. TODAY'S MODERN SHIPS ARE ALMOST 1,000 FEET LONG WITH DRAFTS OF 40 FEET, THEREFORE REQUIRING ADDITIONAL SPACE AND DEPTH BEYOND THAT ALLOWED FOR IN THE ORIGINAL ANCHORAGE DESIGN. IF OUR BISTATE PORT IS TO REMAIN PRODUCTIVE AND SAFE, IT MUST MODERNIZE TO ACCOMMODATE TODAY'S VESSELS. DEEPER AND INCREASED SPACE AT THE RED HOOK FLATS ANCHORAGE IN THE UPPER BAY

Mr. TORRICELLI. Thank you very much and thank you as well Captain for your testimony this morning. The interest of this Committee is a part of its jurisdiction in having the authorizing power for federal research funds and for the oversight of the relevant federal agencies that would both develop and operate these technologies. It is our central belief that there is a disproportionate focus on how to clean the remnants of oil spills, rather than to focus on their prevention. That is what brings us here today and to learn how it is that we have for so long lagged so far behind the pace of technology.

This Committee also has authority on air traffic control and I will tell you that the innovations that are being made in air traffic control leave those agencies in a different century than those who are dealing with vessel traffic control. It is our commitment to close the gap.

Let's begin with how it is that we not only have failed to make progress, but that we indeed find ourselves with lesser margins of safety than enjoyed only a decade ago. Captain, the VTS system. The National Transportation Safety Board indicated its own believe that its elimination almost certainly increased the levels of danger and that from a safety point of view it was in bad judgment. Do you concur with that opinion?

Captain MCCARTY. Well, I think it was an informed decision on the part of the Commandant at that time to meet the several mission demands that were being made on the Coast Guard in the mid part and the latter part of the eighties within the budget that had been appropriated. I was not a party to the decision making process but, in that context, I can understand how it occurred.

Mr. TORRICELLI. What level of spending was saved in taking the VTS out of the New York/New Jersey Harbor?

Captain MCCARTY. I would have to guess that it was on the order of $2 to $3 million a year. But, more significantly, it also provided the Commandant the personnel that he needed for the other mission areas.

Mr. TORRICELLI. It is probably impossible to know whether the failure to continue the VTS system was responsible for any individual oil spill, but it is certainly possible to conclude that the cost of the VTS would be less than the results of any one of many oil spills that have occurred in the Harbor during these years.

Captain MCCARTY. I think that is a reasonable conclusion, yes.

Mr. TORRICELLI. In fact, since it is clear that the elimination of the VTS was a factor in the Exxon Valdez incident, one could conclude that the costs of that clean up were enough to fund the VTS well through the next century and beyond. I trust that there has been a lesson learned in the relevant costs and expenditures from the elimination of the system. Tell me now with the system coming back, is it essentially the same technology that was previously used?

Captain MCCARTY. No, sir, it is not. It is in advance over the technology that existed at the time that New York closed, but it is not what you would call a world class system.

Mr. TORRICELLI. Well let me then make a focused question. I am told that European systems now approximate our air traffic control systems, that on a single radar screen, the speed and direction of each vessel and those that it might encounter in a harbor are all indicated for a person monitoring an entire harbor. Will this updated system approach that level of technology?

Captain McCARTY. No, sir, it won't. Well, let me take that back. It will approach it but it will not equal it. If I may, when we made the decision to open New York, we also took the decision to do it as quickly as possible, largely because of the dredging project in the Kill Van Kull. To put in the system that you are talking about and we will put that system in New York, would have caused us almost a year's delay in opening a Vessel Traffic Service, due largely to the procurement process that would have to take place. The technology that we are putting in now is early eighties, mid eighties technology that is readily available to us through streamlined procurement processes.

Mr. TORRICELLI. Do you feel, Captain, able to address the planning of the Coast Guard with regard to successive technology?

Captain McCARTY. Yes, sir.

Mr. TORRICELLI. What are your — what is the level of work being conducted and the amount of money requested to develop successive systems?

Captain McCARTY. We are preparing a request for procurement that we hope to release within the next two to three weeks for a system that will equal the best that is available in New York today.

Mr. TORRICELLI. This Committee is not aware of any budget requests at this point for the development of new technological systems.

Captain McCARTY. I think you will see that request Mr. Chairman.

Mr. TORRICELLI. And you consider this to be a system equal with that being used elsewhere in the world?

Captain McCARTY. Yes, sir.

Mr. TORRICELLI. How it is Captain that we find ourselves in a position where we are transporting more oil than anyone else in the world, that the navigation system used elsewhere in the world probably have an element of American hardware, probably largely rests in the genius of American software, and yet they are used in all other modern ports but none of our own. Is this a — who should be taking responsibility here? Previous administrations, yourselves, Congress — where does the fault lie?

Captain McCARTY. I don't think there is any shortage of responsibility Mr. Chairman, I think that if we look at the priorities that were established for the Coast Guard, through the early and latter parts of the 1980s, we can see that the demand for a very trafficked areas other than a vessel traffic system.

Mr. TORRICELLI. Captain, if the nation's airports were administered the level of responsibility that has been exhibited in bringing new technology to our ports, it wouldn't be safe to leave your house. In fact, given the flights over my house, it wouldn't be safe to be in your house. I said that for the Port Authority's benefit. Captain, is the answer entirely in developing new levels of technology or, in fact, given the size of oil tankers today and some inherent danger no matter what technology is employed, should the lightering or the development of offshore pipelines to bring oil into the Harbor without the vessels actually entering the Harbor be encouraged or does this involve other and greater risks?

Captain McCarty. Well, I think, at the outset, I would like to say that vessel traffic services is one of many tools that can be used to prevent or minimize the result of maritime collisions or groundings. I think that it is an effective tool but it is still only one tool. The other alternative that you presented there have elements of effectiveness and at the same time elements of risk as we saw in Huntington Beach, and I think that a systems approach to the movement of oil by tanker is probably the best approach to take.

Mr. Torricelli. My question goes beyond that. This is reminiscent to the other part of our jurisdiction on the Shuttle accident. N.A.S.A. assures us not to be concerned, that the Shuttle will safely be launched 98 percent of the time. In other words, two percent of all launches, the crew and vessel will be lost, if that is accurate. Let me ask the same question of you. The time when oil tankers are 200,000 tons, massive vessels, are they inherently providing a level of risk that should not be acceptable in the port of this size and complexity and therefore perhaps our thinking should include unloading oil at sea directly into pipelines as has been done elsewhere, the Gulf Coast for example?

Captain McCarty. Mr. Chairman, I am afraid that you are stretching my understanding of the industry when you talk like that. I don't know what the economics are of an offshore lightering, certainly it would appera to me that if the tanker does not enter port, then certainly the risk of that tanker spilling oil is —

Mr. Torricelli. But, of course, it raises other risks.

Captain McCarty. Yes, sir it does.

Mr. Torricelli. Mr. Birgeles, would you like to address this question, as was discussed before?

Mr. Birgeles. Mr. Chairman, there was a study that was prepared a number of years ago by the Port Authority within the State of New Jersey and the Department of Energy where we did look at servicing the two refineries on the Arthur Kill waterway. One of the refineries subsequently closed and the Exxon Bayway facility is running, I understand, about 50 percent capacity right now. The two sites that were picked for an offshore oil terminal was, if I am not mistaken, was Asbury Park and Atlantic City. The study analyzed those areas in 90 feet of water which is what would be required for these types of tankers. The problem that became or where the study ended was that it was noted that there was a great environmental effect on what would happen when the oil came to shore and the State had to build the tanks on the beach area to contain the oil that would be so delivered by these large tankers.

Mr. Torricelli. So given the environmental difficulties in each system, it is concluded that this was the more acceptable risk.

Mr. Birgeles. That's correct.

Mr. Torricelli. Captain, commanding authority of the ships under the VTS program the way it is operated, previously command remained with the captain of the ship unlike the air traffic control system where a central air traffic controller takes authority for the airplane and directs it to be only overridden by a captain in extraordinary circumstances. Does that remain the best system for vessels in a port?

Captain McCarty. Yes, sir, we believe it does. There is three features that distinguish vessel traffic services for maritime environment from the F.A.A. air control system. The first is that the pilot on board the vessel is a very highly skilled, highly trained and highly tested individual for the waters in which he is licensed, and that skill and training is reinforced each day as he pilots a vessel through the water. He is the expert in that body of water. This contrast with the airline where the airline pilot may not be quite so well informed about a specific section of the airway that he is flying in, but the traffic controller is very well trained in that.

Secondly, there are some major differences between the reaction of a ship to an attempt to change its direction or speed and that of an aircraft. The response of a ship is heavily influenced by externals to the construction of a ship. For example, the depth of the water it might be in, the loading, the weather conditions at the time, wind in particular for vessel such as cargo ships with a high sail area. For an aircraft, the response to a particular command is pretty well defined by the design and class of the aircraft. Terms like a standard turn, I understand, are usable and understandable between the controller and the pilot.

Mr. Torricelli. But, Captain, isn't it possible though with better levels of technology, a central authority on Governors Island would have access to more information about the port at any moment than the Captain of an individual ship, particularly with increases in ferry traffic, pleasure craft and other commercial vessels, that commanding authority would know the speed, capabilities of all of the craft and simultaneously route or re-route them as necessary or do you feel that a captain would have an equal amount of information at any point?

Captain McCarty. Well, with the technology as it exists today and is likely to exist in the future, the developments that we see emerging, yes, it is true that the vessel traffic center, the watchstander is in the center, may have a greater degree of knowledge of the activities in the port area than the master on a single vessel. But, he can communicate that information to the master we believe more effectively than the master can communicate to the person in the vessel traffic center, the characteristics and the responsiveness of the vessel that he is navigating.

Mr. Torricelli. We have, Mr. Birgeles, largely spoken about this as an environmental problem, but it is also a safety problem increasingly because of the return of pleasure craft, use of ferries and the continued use of New York for ocean liners. I have given what I have learned in the brief time that I have had the privilege of chairing this Committee, I have a profound sense that there are some serious accidents waiting to happen in this harbor, given the level of information with which we are operating and the quality of the technology. We have gone in several years from a single ferry line to now the crossing of this harbor by innumerable boats, of all size and descriptions, moving thousands of people, with increases in the amount of ocean cargo and oil, with now innumerable pleasure craft and large ocean liners, without it appears to me any commensurate increase in the safety infrastructure or, has been evidenced, the levels of technology. I have a sense that we have some serious work to do that goes beyond the oil question as well. Would you like to comment on that?

Mr. BIRGELES. We agree Mr. Chairman and we feel that a lot of the potential accidents that have been avoided here in the harbor is due to the skill of the pilots, docking masters, tug companies, of the individual personnel who have been able to maneuver the ships through the harbor. We feel that the VTS system will go a great way to doing this and as I had mentioned in my statement, some of the changes as far as channel deepening, easing of bends, new navigational placement of buoys and — we feel that some of those new systems and placement of buoys and there is a great system of cooperation between the Coast Guard and the maritime industry here in New York now, and we feel that these accidents have even brought us closer together through the —

Mr. TORRICELLI. My frustration though is that the — I agree with you, I think there are real problems of channel widening and depth, and this last accident that took place in the Arthur Kill, the principle question for me was why is there an obstruction in the Port of New York, if struck by a vessel at that speed and size would it even cause to rupture. It appears to me that part of how you plan a harbor is on a fail safe method that a ship, particularly at those low speeds, if it is leaving a channel it should be able to do so with some relative degree of safety and, yet, we haven't achieved it — but that wasn't my point. My point is that we have to go beyond approaching harbor safety in terms of the placement of buoys and the return of this simple level of technology. We have a right to assume that that is all being done, given I know it is not, and to go beyond now and see the kinds of technology — they are going to give us this automatic feedback in positioning, timing, relative placement of other vessels. That is the frustration here and what we are going to be waiting to see is I want to see requests for spending the kinds of technologies that are going to be required to achieve all of that. Given those comments, is it your feeling that participation in a VTS program by a certain level of vessels should be required rather than have it voluntary?

Captain MCCARTY. Yes, sir, it is.

Mr. TORRICELLI. It is your feeling or it is going to happen?

Captain MCCARTY. It is — both, it is my feeling and it is going to happen. The notice of proposed rule making for the reopening of the VTS in New York carries with it mandatory participation —

Mr. TORRICELLI. As of when will it be mandatory to participate in the system?

Captain MCCARTY. The first of December, 1990.

Mr. TORRICELLI. And what size or type of ship?

Captain MCCARTY. Essentially anything above 30 meters, that is, those vessels that are covered by the Bridge to Bridge Radio Telephone Act.

Mr. TORRICELLI. Any vessel over 30 meters must be equipped to participate in the VTS system?

Captain MCCARTY. Yes, sir.

Mr. TORRICELLI. Good.

Captain McCarty. And we are also preparing a national notice of proposed rule making that would make mandatory participation in any Coast Guard VTS.

Mr. Torricelli. Is there any position in the Coast Guard on whether this and successive systems should be paid for by a trust fund operation from its users, rather than the general taxpayers?

Captain McCarty. I have not heard that discussed, no, sir.

Mr. Torricelli. Do you and Mr. Birgeles have a view on this?

Mr. Birgeles. I have no comment.

Mr. Torricelli. It sounds like the Bush Administration. How was this done at other world class ports, is it generally supported by government or by users? When one enters the Port of Rotterdam, is there a fee involved that covers these kinds of systems?

Captain McCarty. Yes, sir, the vessel traffic services in the European ports developed at the port level and not at the national level.

Mr. Torricelli. And they are funded at the port level?

Captain McCarty. And they are generally funded at the port level with varying degrees, but mostly small degrees of involvement from the central government.

Mr. Torricelli. And who developed the systems, the port or the central government?

Captain McCarty. Generally the ports did.

Mr. Torricelli. They develop it, they install it and they pay for it?

Captain McCarty. Yes, sir. Interestingly, however, their ports — the role of VTS in their ports is one of facilitating commerce. I don't think that we would agree to such a narrow perspective in the ports in the United States.

Mr. Torricelli. I am going to yield to Mr. Rohrabacher, but I wondered if first Captain you could just provide us or Mr. Birgeles, I don't know whose map it is, the dates and the indicators on this map.

Captain McCarty. Commander Schneeweis can do that for you sir.

Mr. Torricelli. Thank you Commander. I also apologize for slaughtering your name earlier.

Commander Schneeweis. Sir, it wasn't that bad.

Mr. Torricelli. I lived with that in my life and it bothers me and I apologize to you. Can you turn a little bit so that I am not the only one who can see it—that's fine.

Commander Schneeweis. The yellow area is Phase I Vessel Traffic Service which we will be opening the first of December, 1990, includes the Upper Bay, the Kill Van Kull and Newark Bay. Phase II, in pink, is Arthur Kill, Raritan Bay, and the Lower Bay of New York which includes all of the major access channels to the port. Funding requested for fiscal year 1992. Phase III is the East River from the Brooklyn Bridge out beyond the edge of this chart to the Long Island Sound area which also includes the Hellgate Area.

Mr. Torricelli. And when is that done?

Commander Schneeweis. Fiscal year 1992 funding has been requested for that also.

Mr. Torricelli. Is this the same general coverage that existed before VTS was cancelled?

Commander **Schneeweis**. Sir, Phase I is smaller than the previous VTS area, but when Phases I, II and III come on line, it is considerably larger.

Mr. **Torricelli**. So, previously, the VTS did not include all of the Arthur Kill area?

Commander **Schneeweis**. It included the two major turns in Arthur Kill and it came down a little bit below the narrows.

Mr. **Torricelli**. But, generally, then this is a more comprehensive system?

Commander **Schneeweis**. Oh, yes, sir.

Mr. **Torricelli**. Very good. Thank you very much. Finally, Captain, and I was surprised earlier and I asked — or maybe I asked Mr. Birgeles, the percentage of container traffic that enters the Port of New York which is actually destined for New Jersey and I was told 80 percent of the container traffic actually is New Jersey bound traffic. What are the comparative numbers on oil?

Mr. **Larrabee**. Mr. Chairman, I am Captain Larrabee, the new Captain for the Port of New York — I have been here about a week, but I think I can answer your question. About 76 percent of the product goes into either the Arthur Kill or the Kill Van Kull.

Mr. **Torricelli**. Seventy-six percent of the oil product —

Mr. **Larrabee**. Yes, sir.

Mr. **Torricelli**. — heads for that area?

Mr. **Larrabee**. Yes, sir.

Mr. **Torricelli**. Thank you very much. Mr. Rohrabacher?

Mr. **Rohrabacher**. Captain McCarty, are you satisfied with the training and testing of the tanker captains?

Captain **McCarty**. I am sorry sir, that is really outside of my area. I don't have any knowledge on that subject.

Mr. **Rohrabacher**. Well, first of all I would like to congratulate the Coast Guard on the excellent job they have been doing in my area. I am not sure exactly what is going on in this coast — it sounds like you are doing a pretty good job here, but in Southern California I was exceptionally pleased with the professionalism and the way they handled the recent oil spill in my district. Is there someone on your staff, one of the two other gentlemen, who would like to comment on the training and testing of captains and the crews of these big tankers?

Commander **Schneeweis**. Well, Congressman Rohrabacher, I could comment just generally that that is that we find probably from a statistical standpoint that 80 to 90 percent of the incidents that occur, occur as a result of human error, so improvements in terms of the person directing in the movement of the vessel, whether it be the master or the pilots or a combination, certainly is an area that we are looking at very closely and I think one that we are very concerned about.

Mr. **Rohrabacher**. So it is 90 percent due to human error and not systematic or technological problems?

Commander **Schneeweis**. Not generally a mechanical or an exterior driven occurrence that causes it.

Mr. **Rohrabacher**. Do you believe and does the Coast Guard believe that tanker crews and captains should be tested for drugs and alcohol?

Captain **McCarty**. On a routine basis or following —

Mr. **Rohrabacher**. Perhaps not routine but perhaps intermittent or that they should be — there could be a testing, maybe they should know that they might be tested.

Captain **McCarty**. Once again, I am sorry to say you are outside my area. I can get you an answer — can you?

[The material referred to follows:]

Yes, the Coast Guard believes that crew members on all commercial vessels should be tested for drugs and, in certain circumstances, alcohol as well. Presently, the Coast Guard requires that crew members be subjected to pre-employment, periodic, post casualty, and reasonable cause testing for alcohol after a serious marine incident occurs, or where there is reasonable cause to believe that the crew member is impaired because of alcohol use.

Commander **Schneeweis**. Of course now we are doing that. After every incident, we routinely test for both drug and alcohol and I think that is the case. As far as pre-employment, I believe that is also the case.

Mr. **Rohrabacher**. Do you think that there should be a possibility that these tanker crews and captains know that they might be tested before an accident occurs, rather than just waiting until afterwards to see if alcohol or drugs had an effect on the accident?

Commander **Schneeweis**. You are reaching my extent of the present situation, but I believe that there is a proposal now to do random testing as we know it.

Mr. **Rohrabacher**. And is the Coast Guard taking a position on that?

Commander **Schneeweis**. I'd like to get back to you on that.

[The material referred to follows:]

Yes, the Coast Guard believes that random drug testing for commercial vessel personnel holding safety sensitive positions aboard ship should occur. The requirement for random drug testing was included in the Coast Guard's final rule published on November 21, 1988. Subsequent to the publication, the Federal District Court for the District of Columbia determined that the range of personnel covered by our random drug testing regulations was overly broad and invited us to rewrite the regulations to limit random drug testing to personnel in safety sensitive positions. The Coast Guard has completed the re-write of the random testing requirements and hopes to publish a final rule shortly.

Mr. **Rohrabacher**. Okay, thank you. Captain, do you believe that the global positioning system will have a dramatic impact on the way ships are guided and directed into the ports and harbors of America?

Captain **McCarty**. Yes, sir, I think it will.

Mr. **Rohrabacher**. And when we will feel that change begin to happen?

Captain **McCarty**. Well, we are developing a test plan for Prince William Sound that would use Loran-C and GPS in what we call a dependent surveillance mode, that is the tankers would re-transmit their signal to the vessel traffic center. For the portion of Prince William Sound from the radar coverage down to the entrance at Cape Hinchinbrook. To take it into international waters, of course, has international implications and those things would have to be addressed through —

Mr. **Rohrabacher**. When will that happen what you were just mentioning, this test?

Captain **McCarty**. Well, the plan is not yet funded, it will happen approximately 18 months after the funding is provided.

Mr. ROHRABACHER. All right, but the global positioning system could well revolutionize the whole way that we are dealing with this, with the VTS and the different systems that we have set up, is that correct?

Captain MCCARTY. Yes, sir, I think its principale contribution is going to be to extend the coverage available within economic acceptability.

Mr. ROHRABACHER. Right, and we spoke a little bit about how in other countries the ports have their own fees that are being paid by people who are doing commerce with them in order to facilitate traffic control. Do you think it would be — does Coast Guard have any position on a federal mandate for a perhaps uniform system of traffic control for our ports and harbors and in dealing with international trade in the United States?

Captain MCCARTY. Well, the study that we are conducting of the 23 ports should result in a uniform policy with regard to the operation of vessel traffic services, at least in those ports that have very high movement of oil or hazardous materials.

Mr. ROHRABACHER. And in charging a fee for those using the system, I would imagine it would be outside of what the Coast Guard would want to do, but just to put it bluntly, it sounds like a good idea to me. I am looking—thank you very much Mr. Chairman. I am looking forward to the testimony of Dr. Eugene Guest who will be also talking about the training of tanker crews and captains because as we have just heard, 90 percent of the accidents have something to do with the faulty decision making of the personnel themselves, and I want to thank you very much for giving me this opportunity to ask questions.

Mr. TORRICELLI. Thank you Mr. Rohrabacher. I have before me a summary sheet that indicates 1,700 tank vessel traffic entrances a year, 18 billion gallons with 100 transfers each day—those are accurate numbers?

Commander SCHNEEWEIS. Yes, sir, I would say so.

Mr. TORRICELLI. That number on the maximum tanker size being 83,000 dead weight tons, is that a limitation of policy or practicality or actual physical space in the harbor—why the 83,000 dead weight ton limit?

Commander SCHNEEWEIS. Part of that sir is based on draft and of course the draft limiting—draft here is 35 feet, so a lot of those vessels are either lightered or transferred in part before it reaches its final destination.

Mr. TORRICELLI. Does that involve an economic cost to the region — that we are requiring smaller vessels to bring this oil?

Mr. BIRGELES. Yes, it does. The pilots that bring vessels up the main channel which is 45 feet at mean low water and they will bring them into the anchorage areas that I had spoken about and they will wait there and lighter to barges and then transfer until they get to 35 feet.

Mr. TORRICELLI. Is this an unusually shallow depth for a world class port or is this the same experience that is happening in other similar ports?

Mr. BIRGELES. No, it is a very shallow depth and that is one of the reasons that we are deepening the Kill Van Kull and Newark Bay to provide greater safety for vessels.

Mr. TORRICELLI. Has it always been this shallow or is it a failure to maintain it in recent decades?

Mr. BIRGELES. It is not a failure to maintain it which we do and Congress has provided the funds for that on an annual basis. It is mainly due to economics. The Arthur Kill is rock and when—the costs are just enormous to deepen that any deeper.

Mr. TORRICELLI. Gentlemen, thank you very much for your testimony. It has been very helpful.

For our second panel if we could please, Robert Denaro, Trimble Navigation; Edward McGann, Megapulse; Captain Williams, ARCO Marine; Thomas Braithwaite, Sperry Marine. Gentlemen welcome and thank you for your testimony today. As you have no doubt now been convinced from our last panel, we do enjoy the exercise of asking questions and exploring different avenues on this or indeed any subject. Therefore, if we could reserve as much time as possible for those questionings I would appreciate it. Please try to keep your remarks to a few minutes if you might. However, we would also invite you to submit any prepared remarks in their entity so that we can share them with our colleagues who are not with us here today and then enter them into the formal record.

Mr. Denaro, why don't you begin, if you would, with your remarks.

STATEMENTS OF ROBERT P. DENARO, VICE PRESIDENT, TRIMBLE NAVIGATION, LTD, SUNNYVALE, CA.; EDWARD L. MCGANN, MEGAPULSE, INC., BEDFORD, MA.; CAPTAIN OLIVER F. WILLIAMS, SENIOR ADVISOR MARITIME AFFAIRS, ARCO MARINE, INC., LONG BEACH, CA.; AND THOMAS E. BRAITHWAITE, SPERRY MARINE, INC., CHARLOTTESVILLE, VA.

Mr. DENARO. Okay, thank you Mr. Chairman, members of the Committee. I brought along slides to present but the forum won't permit that so I will try to go over it in words and do by best —

Mr. TORRICELLI. Actually the limitation is that the screen is here — you can see it.

Mr. DENARO. Yes, I understand that. Let me try my best to portray it in words. Basically what I am presenting is a method of preventing oil spills by use of a technology solution that is available today and that is GPS-Augmented Vessel Traffic Services and, as Mr. Rohrabacher discussed, GPS is a technology coming on-line that is available today.

There are some practical issues concerning prevention I think. First of all, we are talking about a safety issue so we need a highly reliable system, that means communications and positioning must be highly reliable. We don't want to create, as we have already heard, the discussion about training, we don't want to create a training hassle for the Coast Guard, so it has to be easy to use and move into their type of operation very efficiently. Certainly, any solution has to be within federal and state budgets. If it is going to happen within my career or my lifetime, this has to be realistic. And, finally, it has to be available technology today. We can't get enamored with technology that is going to get us into difficult development situations. We need something one step back from the exotic so that it is doable today.

I think the concept I am talking about meets these criteria. As I said, it is GPS-Augmented Vessel Traffic Service or Vessel Traffic Management. The basic is GPS used for positioning on the vessels. The vessels reporting very precise position back to the harbor, the vessel traffic service. This can be done over long range, over satellite communications such as "Inmarsat", in the local harbor area it could be VHF or UHF communications that are already on board the ship.

It looks like a complex system but basically the infrastructure is in place. The communications systems are in place and GPS is in place. What we are talking about is adding those elements that give us a total system solution so that we have a solution to prevention problems.

It also looks expensive, but let's talk about the GPS part. It is expensive but it is already paid for. The last I heard, the estimated total budget for the Department of Defense is going to be $12 billion for GPS. To date, I think the number is some $8.6 billion. If there were ever a piece dividend from the D.O.D. investment, I think this is one of them.

GPS is developed for high precision, high reliability. We are going to fly and land aircraft on GPS. Certainly it is something that can be used for tanker safety. The system will be in place with respect to positioning on the surface of the earth in a two dimensional mode — we should have full coverage worldwide, certainly all of the coastal areas of the U.S., on a 24-hour basis, by perhaps December of this year, the Coast Guard has stated that.

And although it is going to be operated and maintained by the Department of Defense, and although they developed it, it was mandated for Department of Transportation use a good ten years ago, and last year the Coast Guard was named as the responsible organization for civil use of GPS. And lest I forget to add this, the signals are free, so I think there is a certain incentive for using the system.

Key features of this system are high precision. We have been using GPS in a variant of it called differential GPS in the Gulf of Mexico for oil exploration for four or five years right now. I think Shell Oil and others will tell you that they have gotten very reliable service at the sub-five meter accuracy level from this system — extremely reliably.

With this system, of course, we will be sending out position reports, but one could envision sending other information about the vessel. Its current draft, its cargo, hazardous cargo or not, its crew complement and so forth. The idea is that we have a simultaneous view of a harbor situation at the vessel traffic service and on board the ship. In other words, everyone is looking at the same thing, and I think this is a key to the answer of the problem of human caused error. Sure we can talk about training and that is an important part of this, but the fact is let's get multiple eyes on that problem and the analogy to air traffic control I think is a very good one — whether it is positive control or not by the Coast Guard, the issue is that we have got multiple eyes on the problem.

Prototype systems have been demonstrated. We started May of 1989 showing a prototype on a P.C. I am not saying that you necessarily are going to have P.C.s in the vessel traffic service, but the point is that the technology is very easy to implement.

We—looking at the transcript of the incident in Valdez, the channel boundary, the trespass of the channel boundary by the Exxon Valdez was some 22 minutes before it ran aground on Bligh Reef and I would submit that an automatic alarm on the bridge or monitoring at the vessel traffic center of that event would have been sufficient time to have that ship maneuver in that time, regardless of its size.

The systems that we are taking about on board, and on board is a very important part of this concept. Electronic chart and display systems on board with GPS and I might add Loran is a system that is already on board, communications are on board, the combination of these systems give the picture of the situation to people on the bridge in what we call "situation awareness", graphic displays. What we are doing is we are moving towards language independence which rely on displays, so foreign crews and so forth can visualize the situation regardless of the language problem.

Charts are available today on CD-ROMS that can be displayed on these types of systems. GPS and Loran are already integrated systems. My company has sold a particular unit, several hundred versions of these are use in ships around the world today.

What GPS does as I said is it brings the situation awareness on board the ship and the positive identification of all vessels and their content at the shore based site.

You know, I don't know whether the Coast Guard should be in the business of responsibility for positive control, but I am convinced that we would pick up 99 percent of the incidents on board on the vessel first. In other words, we move control to where it belongs on the bridge and the back up is at the vessel traffic center as well as possibly other multiple sites.

The system is very complementary with radar, and I am not suggesting that we replace radar. For example, I think you need radar in areas of high traffic congestion because there will be certain smaller vessels not equipped with GPS or Loran. If everybody over 30 meters has Loran or GPS, then we are tracking the major players with positive identification in there. But, imagine for example, knowing the draft of each major ship as it is coming in and being able to show both on the bridge and on the shore the effective channel for that ship based on this current draft — this technology is available today.

And the other thing is that GPS, what it brings to the system, is it gives us further range than radar and yet at a very fraction of the cost of radar. We were talking to the Pilots Association in Rhode Island about their problem. We suggested a portable GPS system that the harbor pilot might bring on and he said, "Well, that is not going to do for us in Rhode Island because he gets on five miles out and if we are going to control a tanker, we want to pick him up some 60 to 80 miles out when everything is calm and routine and we can get everything coordinated and make sure we understand", and that is the key to solving these problems of human error is getting everything under control at an early point. GPS gives us that extended range beyond the radar at yet a fraction of the cost.

So, in conclusion—and by the way, I might add I was pleased to hear the comment about passenger safety. The increased use of ferries is certainly something that has to be considered. I hope we are not sitting in one of these meetings talking about a passenger involved or ferry involved incident at some time in the future. GPS obviously brings that kind of control in there and the commercial industry is going to benefit too. Their schedule control and reliability is something that would benefit from this, so I think there is incentives.

In conclusion, I represent that Trimble Navigation, we are in Silicon Valley, home of all of the modern technology computers, signal processing and so forth — I don't have all of the answers to oil spills from tankers, but I think this is an important part of it. You know, double hulls, perhaps, makes sense as well. We started showing prototypes of this technology last May after the Valdez incident. We recommended an inplace, live demonstration to complement the necessary cost-benefit studies by the Coast Guard. These studies are being done right now spending millions of dollars. The evaluation prototypes of this kind of concept that can be put in today, could have been put in a year ago, and I am convinced that had we put some of these prototypes even here in New York, there is a very strong chance that we would have prevented the incidents we have seen right now, with this prototype system, at the same time we are learning how these systems can move into the infrastructure that we are talking about here.

Thank you very much.

[The prepared statement of Mr. Denaro follows:]

GPS-AUGMENTED
VESSEL POSITION MONITORING AND ALERT SYSTEM
FOR ENHANCED MARINE TRAFFIC MANAGEMENT AND SAFETY

Hearing on Vessel Traffic Control
New York World Trade Center
July 30, 1990

Prepared For:

U.S. House of Representatives
Committee on Science, Space, and Technology
Subcommittee on Transportation, Aviation, and Materials

Prepared By:

Trimble Navigation, Ltd.
Tracking and Differential Systems Division

GPS-AUGMENTED VESSEL POSITION MONITORING AND ALERT SYSTEM

Maritime transportation safety and performance can be improved by providing complete situational awareness simultaneously on ship and shore in real time. The vessel position monitoring and alert system is an intelligent navigation decision analysis aid that displays vessels' position, velocity, and heading information relative to identified navigation hazards on graphic electronic charts. When a crisis is detected, such as a vessel leaving an authorized channel, attention onboard the vessel and on shore is automatically focused, through the use of audio and visual alerts, on a graphical depiction of the situation involving the vessel. This graphical display provides language-independent information and complete situational awareness that ensures effective prevention of vessel navigation accidents through early crisis detection both onboard the vessel and at shore-based monitor sites by increasing the amount of time available to decide on the appropriate corrective action.

Marine transportation safety is assured by multiple levels of redundancy when tracking and monitoring vessels. Redundant vessel tracking is accomplished by integrating several navigation sensors (for example GPS, LORAN, radar) into a system solution that maximizes the best technical characteristics of each.

Global Positioning System (GPS) technology is a key element of this vessel position monitoring and alert system because it provides continuous, world-wide, highly-accurate, all-weather, time-tagged vessel position and velocity information. GPS automatically provides complete coastal coverage. Precise navigation information in harbors is provided by Differential GPS (DGPS). The value of GPS is that it provides high-integrity vessel location information over an extensive area for low installation and maintenance costs.

Also, situational awareness can improve marine traffic management through improved workload balance between the vessel and the shore-based monitoring station. More effective marine transportation safety and traffic management is possible by providing monitoring capabilities similar to the Federal Aviation Administration's (FAA's) Air Traffic Control (ATC) system. A vessel monitoring and alert system that integrates multiple-sensors (including GPS) provides capabilities similar to ATC. In this system, each vessel is positively and uniquely identified and independently monitored to reduce the probability of a missed dangerous condition. However, as in aviation, primary responsibility for decisions remains onboard the vessel.

VESSEL TRACKING AND MONITORING

The ship-board tactical computer uses (1) Navstar Global Positioning System navigation capabilities for world-wide coverage, and (2) Long Range Navigation (LORAN) capabilities for redundant harbor and coastal coverage. All vessels classified as carrying hazardous cargo would be equipped with GPS and LORAN receivers in order to obtain real-time precise navigation. Each of these systems is operated in self-correcting "differential" mode to provide sufficient accuracy (meeting U.S. Coast Guard requirements of 8 to 20 meters) to allow precise harbor/harbor entry channel navigation. In fact, Trimble-GPS systems are the dominant positioning service today supporting offshore seismic oil exploration in the Gulf of Mexico, providing 2-3 meter accuracy at distances of greater than 200 miles offshore.

GPS is the world's most comprehensive high-integrity navigation system. The Navstar GPS has been developed over 17 years by the U.S. Department of Defense (DoD) and civilian agencies with an $8.4 billion investment. GPS is a constellation of radio-navigation satellites that provides extremely accurate, reliable navigation information world-wide, 24 hours a day (complete two-dimensional coverage anticipated by fall 1990). GPS is a passive system where an unambiguous radio-navigation signal is sent from each satellite to the receivers. GPS cannot be saturated; the potential number of GPS receivers is limitless. In 1985, the President declared GPS to be a national resource and stated that no user fees are to be required.

ELECTRONIC CHARTS

A key characteristic of the system is the graphical depiction of the actual National Oceanic and Atmospheric Association (NOAA) chart for the area, identifying hazards to navigation, simultaneously onboard the vessel and at the monitoring station. The identical chart and crisis situation with vessel position, course, and cause of crisis are displayed to both the crew and the monitoring station personnel. The electronic graphical chart is important because it provides complete situational awareness that is independent of nationality or language; situational awareness is the key to avoiding indecision and to reducing confusion. The electronic graphical chart products are current off-the-shelf products.

A significant advantage of the GPS-augmented Vessel Position Monitoring and Alert System is that it maintains the proper distribution of responsibility (as well as cost) for navigation safety. The vessel bridge retains responsibility for navigation "decisions", while the U.S. Coast Guard. Vessel Traffic Service (VTS) can operate as "traffic supervisors". Thus, this GPS-augmented system achieves a level of surveillance redundancy which assures positive detection and early identification of navigation crises. This keeps the U.S. Coast Guard out of the business of commanding merchant vessel navigation steering, as they would be forced to do if a radar-only based system were used to maintain navigation safety.

The shore/land-based monitoring stations consist of high-performance, multiple-window, high-resolution, color graphics workstations integrated with a GPS navigation reference receiver. Monitoring stations can be established in the local harbor at the current, or proposed, U.S. Coast Guard VTS stations, as well as at a central site at Coast Guard Headquarters. Multiple data presentation windows are provided on the workstation to allow operators to handle multiple crisis situations simultaneously. Multiple workstations are provided for redundancy and data traffic handling. All vessel position reports are archived for later review. Also, the system provides capabilities to present a real-time instant replay in a separate "display window" on the workstation. The shore/land-based monitoring stations also include analysis tools for path propagation, hazard intercept analysis, and zoom and orientation control.

COMMUNICATIONS

The system relies on two-way, real-time communication between the vessel and the shore. The vessel reports its navigation information on a periodic basis during normal operations; reports can be communicated continuously during critical maneuvers or crises. Also, at any time, the personnel at a monitor station can poll a position report from any vessel. Hence, no lost or phantom ships are possible as long as the vessels are equipped with the system.

The real-time communication links are provided using: UHF/VHF and satellites. Shore-based beacons (i.e., U.S. Coast Guard Non-Directional Beacon System [NDBS]) could provide the communications link to transmit GPS "differential" corrections to the vessels to achieve enhanced accuracy and reliability. Satellites would provide the world-wide, long-range communication link for vessels over-the-horizon from the shore-based beacons.

INTEGRATION WITH RADAR

The GPS-augmented vessel position monitoring and alert system is completely compatible with the existing U.S. Coast Guard VTS. An integrated system of several navigation sensors maximizes the use of existing resources and infrastructure. A flexible system architecture allows seamless integration of existing surveillance radars. Also, GPS can provide accurate coverage at any range from the VTS, and at a very small fraction of the cost of radar (radar requires site acquisition, installation, maintenance, and manpower-intensive operations).

Radar is still necessary for traffic management involving collision avoidance with vessels not equipped with GPS. In a radar-only marine traffic management system, the ships are completely passive, so the U.S. Coast Guard radar monitoring personnel must become involved in navigation decisions and steering of the vessel in crisis situations, all from a remotely located site. An integrated system of GPS, radar, and communications is required, where GPS provides the extended area coverage and enhanced positive control of GPS-equipped hazardous-substance transport, commercial passenger vessels, and large ships.

Trimble Navigation Ltd. has worked with the U.S. Coast Guard Research and Development Center since 1984 on initiatives to apply precise differential GPS navigation to the harbor/harbor entrance requirement. This very successful program has proved the concept of satellite positioning for effective vessel navigation (up to 2 meter accuracy demonstrated).

NAVIGATION ALERTS

The GPS-augmented Vessel Position Monitoring and Alert System employs visual and audible navigation alerts as the effective means to prevent vessel collisions, rammings, and groundings. Navigation alerts have been identified by the U.S. Coast Guard as "the single most effective solution to prevent accidents" (U.S. Coast Guard study report CG-D-55-78). The alerts are determined from past and present position reports from the vessel, and the vessel's planned and approved course.

The GPS and LORAN positioning system onboard the vessel is an intelligent system. It automatically monitors navigation channel boundaries and hazards and computes potential crises based on current and projected vessel course, speed, and maneuvers. If a crisis is detected, the system automatically and simultaneously alerts the bridge and the monitoring station. The system will even calculate the "time-to-decision" to indicate the immediacy of the crisis and the need for action.

This system provides for: self-contained alerts (on-board vessel), regional alerts (at regional base), and central alerts (at central office). The alerts provide warnings of (1) hazards along the vessel's projected course, (2) position variations between the vessel's planned and actual course, (3) cross-track position violations of allowed threshold (i.e., approved shipping lane), and (4) cross-track rate (velocity) variations between the vessel's planned and actual course.

At the Regional base and Central office, all alerts concerning vessels in a local geographic area (i.e., local alerts) are displayed simultaneously. These local alerts are determined independently of the alerts determined on-board the vessel. In addition, vessel information can be requested on demand.

SUMMARY

Effective marine transportation safety and traffic management is now possible by using a vessel position monitoring and alert system both on board ships and at shore-based monitoring stations that integrates reliable communications, modern computer technology and several navigation sensors. By augmenting traditional sensors, such as surveillance radar, with GPS, navigation accident prevention and environmental protection can be realized at an affordable cost.

Trimble Navigation Ltd. has developed an integrated system based on the vital national resource, GPS, developed by the DoD. We believe that this integrated system is the only way our country can protect its environment and still meet the nation's increasing maritime safety and traffic management requirements.

Mr. **Torricelli**. Thank you Mr. Denaro. That was not only interesting but very helpful. Obviously a great deal of what we have been thinking and if you have had some frustration about getting people who are interested in some of these ideas, you just met your audience. Mr. McGann?

Mr. **McGann**. Thank you Congressman, all of the members of Congress and interested parties.

I think I second what Bob has said. The technology is here, it is not only here today. My purpose of coming is to describe a system very briefly which we, as U.S. taxpayers, paid for through the Agency for International Development, and which was installed in the Suez Canal in the early eighties, designed in the late 1970s.

Essentially, that system combined radars, communications and Loran-C to control the traffic and not incidentally to continue the income in the Suez Canal by avoiding traffic accidents and obstructions. That kind of system if you just look at its performance is one where it could handle up to 200 vessels being polled every ten seconds using only four radio channels, providing an accuracy of 10 meters or better, providing a very precise estimate of velocity and acceleration. Because one doesn't just want to see where the vessel is, but the preferred way to prevent movement into a dangerous area or into juxtaposition with another vessel, is to describe the velocity and acceleration of those vessels as they are moving. So, you can predict where they are going to be, hopefully to keep them out of trouble. So, ten years ago, all of the technology was there, a very high precision system was installed. Unfortunately, for the last decade, the United States has gone to sleep.

But, technology is even better today. Whether it is GPS or Loran or whatever, the ability to have dependent surveillance, the key point is to have the identification of the vessel uniquely, whether it is an airplane or a tug boat or a car in the street, the identification is the key part. After that comes the position—accurately enough for the job—velocity and acceleration.

I will summarize then a goodly number of comments on GPS and this is not exactly the forum to have a technical conflict on whether you should have GPS or Loran,-and for information Congressman Rohrabacher, the Wild Goose Association, an association with a funny name, but the Association of the Loran Community will be meeting in your district in Long Beach in October of this year.

Let's take a few minutes just to look at some of the advantages of using Loran-C and I am not saying we shouldn't use GPS, but I will bring up a couple of those questions as well.

Loran-C signals are presently available over all U.S. navigable waters, and that is out beyond the 200 mile limit, so we are not worried about the ranges of 60 or 100 or 300 miles.

Loran-C is an official maritime aid to navigation for U.S. and Canada.

Loran-C receiving equipment is presently mandated carriage on all vessels 1,600 gross tons or over.

U.S. Coast Guard measurements indicate that in the harbors of the United States, 20 meter accuracy is achieved in better than 50 percent of them, 50 meters in better than 90 percent, and 100 meters in better than 99—that is without any differential correction or enhancement.

Loran-C system has been verified by years of actual operation. Availability is in excess of 99.97. Its integrity and its use is now growing worldwide.

Loran-C user equipment is proven, it is economical, it is constantly being improved.

Loran-C is the only legally recognized radio positioning reference system in maritime litigations.

Loran-C is the most widely used radio nav system with over a million users. We are rapidly approaching cooperation with Russia and it is also the preferred system of many maritime agencies internationally, such as IALA, International Association of Lighthouse Authorities—and IMO—the International Maritime Organization—for terrestrially based radio nav aids.

What I think we are saying is that in addition to a harbor type VTS, the use of Loran-C or if, in a comparable way GPS, along the entire coast of the United States, not only provides the vessel traffic service wherever needed, but it also helps in other things like expanded search and rescue, providing a common grid for drug interdiction, and enforcing the 200 mile limit. It also provides the direct mechanism for collecting user fees anywhere along the water.

So, I think the message that I have today is that, yes, the technology is available. One can chose among the sensors, one can chose among the communications, but the information can be made available on the vessel, on the platform as Bob said, and on the shore, so that there will be many eyes looking at the situation.

The choice of Loran-C, as my expertise is, or GPS is a little broader than just the technical issues. With all due respect for the Congressman's district, the cost of maintaining GPS is about a billion dollars a year. The cost of all nav aids in the United States is $50 million. One has to be careful I think in the selection of these kinds of goods as to which way we want to go. So, there are some serious questions, they are operational and they are legal and they are whatever, but whatever they are, providing the safety of movement, and economic movement of traffic, aviation-wise, using dependent surveillance, as the Congressman said, they are identical technologies, so dependent surveillance is going to come to the aviation industry and to the maritime industry worldwide, and I think it is here today. It just takes the will to do it, the discipline and the will that say it has to be done and it can be.

[The prepared statement of Mr. McGann follows:]

Testimony at the 30 July 1990 hearing convened by the Transportation, Aviation and Materials Subcommittee of the U.S. House of Representatives Committee on Science, Space and Technology to address various issues related to Vessel Traffic Systems (VTS)

Prepared by

Edward L. McGann
Megapulse Inc.

July 25, 1990

Representative Torricelli, other members of the Congress, and interested parties.

It is my pleasure to be present today and to contribute to this discussion on the currently important topic of Vessel Traffic Systems. The intent of my remarks will be to provide some assurance to the participants in this discussion that if operational, economic, and/or environment and quality of life evaluations justify the establishment of VTS, then indeed the technological capability currently exists to implement any reasonable level of required VTS performance.

It might be remembered that the early 1970s saw the Argo Merchant incident which provided much of the motivation for the establishment of an official maritime aid-to-navigation system in the U.S. and Canada--the designation of which eventually was given to the LOng Range Aid to Navigation (LORAN-C) system. The late 1970s saw the great rise in interest in VTS as a result of the Amoco Cardiz incident off the coast of Normandy. It is perhaps appropriate then that as we again address VTS as a result of the Exxon Valdez disaster and the plethora of maritime incidents that have since come to the attention of the public--in this the decade of the environment--that in order to give evidence of the current availability of technologies appropriate to VTS configurations, I have chosen to begin by describing the configuration and performance of a VTS designed in the late 1970s and implemented in the early 1980s. This system was installed in Egypt for operation by the Suez Canal Authority (SCA) as a result of a World Bank study which predicted that Canal traffic would sharply increase in the latter part of the twentieth century, necessitating the widening and deepening of the Canal as well as improving its safety and operational procedures. The SCA VTS was designed and implemented by a consortium of U.S. companies--including Megapulse Inc., which I represent--with funding provided by the U.S. Agency for International Development.

Described at the time of its implementation as the most advanced system of its kind in the world, the SCA VTS utilized and integrated the operation of radars; radar scan converters; microwave, VHF and UHF communications networks; Loran-C transmitters and receivers; graphic and alphanumeric displays; and a family of computers. The primary purpose of the SCA VTS was to ensure the continuous operational status of the Canal and the income to be derived therefrom by preventing accidents which might result in obstructions and traffic stoppages. To achieve this end, the position, velocity and accelerations of all of the vessels in transit were continuously monitored and compared against the expected movement profile for that type of vessel in each section of the Canal. Deviations from the expected profiles resulted in automatic alarms being raised on the Control Center displays which resulted in specific advisories being given verbally to the pilot aboard the vessel causing the alarm, and also, if required by the urgency of the alarm, to the pilots aboard following vessels in the convoy and/or to SCA support and service vessels positioned in the convoy or along the Canal. The secondary purpose of the SCA VTS was to expedite the formation of the convoys at the entrances of the Canal by scheduling each vessel from its temporary mooring or with respect to its arrival time from the open ocean into the Canal approaches. In order to satisfy the primary and secondary purposes of the SCA VTS, it was necessary to achieve an unambiguous identification of each vessel and a highly accurate determination of the position of each vessel at precisely determined sampling times. This requirement was met by the use of a LOng Range Aid to Navigation (LORAN-C) system.

Three Loran-C transmitting stations were situated along the Canal so as to provide adequate Loran-C signals over the 100 mile span of the Canal. Each vessel in transit and each support, service and security platform (vessel, truck, or helicopter) was equipped with an electronic package containing a Loran-C receiver and a VHF radio transceiver--each with its own unique identification code. Periodically, the computers at the Control Center sent out interrogations to each of the Loran-C/VHF packages via the microwave link, which served as the communications backbone along the Canal, to one of the array of VHF stations along the Canal beginning with the one judged nearest the platform being polled but going on to search via other VHF sector if there was no response from the initial sector. The specific Loran-C/VHF package being addressed would then respond with its location which in turn would then be passed on the return path from the VHF location along the microwave link to the computers at the Control Center where this data would then be processed for presentation on the traffic situation displays, and for storage in the vessel track data memory files. The essential performance parameters of the Loran-C subsystem of the SCA VTS can be summarized as:

Position Determination Accuracy	10 meters, one sigma
Velocity Determination Accuracy	0.5 knots
Polling Rate (four voice quality VHF channels)	200 platforms every 10 sec

(Polling priorities are adjustable depending on vessel importance, category, location and status.)

At the SCA VTS control facility there are five consoles utilized by three traffic advisors, a supervisor and a system configuration manager. Also contained there is the majority of the processing and data storage capability required to operate the system as well as a variety of communications interfaces and Loran-C signal monitors. Each console contains a graphics display, an alphanumeric display and a communication panel. On the graphics display is presented pre-stored canal shorelines and channels as well as buoys and other nav-aids along with color-coded vessel information derived from a mix of Loran-C and processed radar data as required, except for the system configuration display which can also illustrate system element status via a color-coded block diagram. (All SCA VTS equipment elements--radars, Loran-C transmitters, and communications facilities are operated unattended, thereby minimizing operating costs but necessitating such remote monitoring and control capability.) The alphanumeric display is used to present information relevant to each vessel as drawn from Lloyds listing, or regarding past transit problems, or other specific information such as the vessel masters name.

Radars are situated at the Canal entrances and at a mid-Canal convoy by-pass area. Information from these radars--both processed and raw--is passed along the microwave link as required. The Canal entrance ports are each also equipped with two control consoles at which the operations involved with convoy formation are accomplished. In the interest of a high degree of system availability all critical elements of the SCA VTS are redundant or overlapping coverages are provided.

Recordings of daily convoy movements are recorded and used to train pilots and traffic advisors and to assess possible alternative routings which will minimize possible accidents and such operational problems as Canal wall erosion. Such traffic recordings--complemented by system status also are available as legal records for review and assessment of the system performance subsequent to any accident. The processing capability is also used for logistic support, personnel scheduling and even the billing of transit charges--which might be of interest to anyone considering the collection of VTS user fees.

You will remember that the point I was trying to make in describing in such detail the SCA VTS remember was to illustrate that in 1980 the capabilities existed to implement highly integrated, effective VTS. As we move now into the 1990s, it is clear that technical capabilities available for implementing VTS are not only greatly improved but the choices for the various subsystems and elements have significantly expanded--as for example--shipboard satellite communications which was not reasonably available, especially for the smaller ship in the late 1970s.

Now for the purpose of raising considerations, other than the technical ones, let us now consider some advantages of implementing a U.S. national VTS based on Loran-C which as described above provided the primary and critical performance elements of the SCA VTS.

- Loran-C signals are presently available over all of the U.S. navigable waters.

- Loran-C is an official maritime aid-to-navigation system for the U.S. and Canada.

- Loran-C receiving equipment (or equivalent) is mandated carriage on all vessels over 1600 gross tons in transit U.S. waters or calling at U.S. ports.

- USCG measurements indicate that U.S. harbor areas are accurately served by Loran-C: 50% to less than 20 meters; 90% to less than 50 meters; and 99% to better than 100 meters year round variation (without differential correction improvement).

- Loran-C system performance has been verified by years of actual operation and is constantly being improved to reflect the new and more stringent requirements placed upon its availability and integrity by the growing aviation vehicle location and time synchronization user communities.

- Loran-C user equipment is proven and economical and is being constantly improved reflecting the new user requirements and the economic and technical competition of a multi supplier market.

- Loran-C is the only legally recognized radio positioning reference system in maritime litigations.

- Loran-C is the most widely used radio navigation system in the world with a worldwide user community estimated to be approaching one million.

- Loran-C enjoys widespread and growing use among the general aviation community and will shortly be adopted as the official system for the U.S. meteorological balloon tracking program.

- Loran-C is in the process of expansion worldwide--including cooperative efforts between U.S. Loran-C and the very similar U.S.S.R. Chaika system.

- Loran-C has been designated as the terrestrially-based system of choice by major international maritime organizations and many countries as an alternate for or complement to proposed satellite navigation systems.

In addition to performing the essential tasks of a VTS--the safe and effective movement of goods and people--a nationwide VTS based on Loran-C with a mandated "dependent surveillance" of all vessels within the coverage area could also serve other vital interests such as expanded emergency search and rescue capabilities, a common grid for drug interdiction effort coordination and for enforcing the 200-mile limit restrictions.

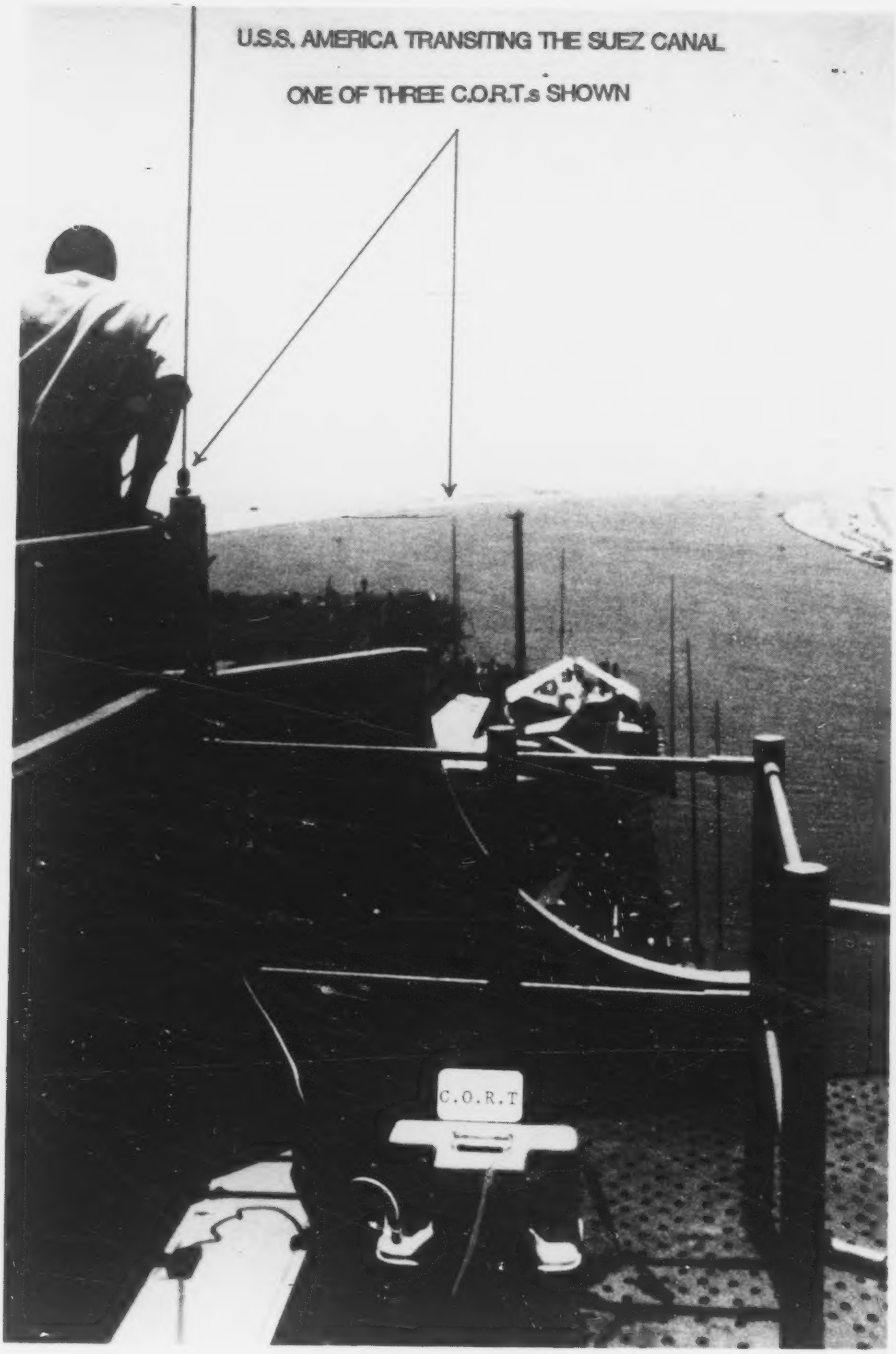
I hope that my presentation helped to assure you that if VTS capabilities are judged to be required or desirable for all or some of the U.S. navigable waters, that proven technology is available to implement any such capability.

I thank you all for the privilege of being a part of this discussion.

Author's biography--Mr. Edward L. McGann has been involved with Loran-C since the mid-1960s. He has presented a number of papers on the subject and has worked on the design of various Loran-C equipments and the implementation of Loran-C systems in many parts of the world. Expansion of Loran-C world-wide has been his continuous goal. Mr. McGann is currently Executive Vice President of Megapulse Inc., Bedford, MA, USA. He is a Director and former Vice President of the Wild Goose Association and received the President's award for service to Loran-C. He is a member of the Institute of Navigation and was a committee member on the National Ocean Industries Association. Mr. McGann holds a Bachelors and Masters degree in Electrical Engineering from the University of Lowell in Massachusetts.

ATTACHMENT A

Figure 1	A representation of the elements of the Loran-C Subsystem of the SCA VTS. It can also be used to visualize the location of the radars at Port Said, Port Taufic as well as the locations of the central control facility at Ismailia and the control facilities at the ports.
Figure 2	Illustrates a vessel traffic advisor console encompassing a graphic, an alphanumeric display and a communications panel. A portion of the panoramic presentation of the entire Canal traffic is shown above the traffic advisor.
Figure 3	Illustrates a Carry On Receiver Transmitter (CORT) package positioned on the bridge of the aircraft carrier USS America during a transit of the Suez Canal. The CORT contains a Loran-C receiver, a VHF transceiver and a battery pack. The unit with its unique identification code is interrogated at least once every 10 seconds to determine its precise position. During the 24 hour transit of the 100-mile canal the apparent flight deck length variation as measured by one CORT on the bow and one on the stern was approximately 3 meters, which was a dynamic demonstration of the accuracy of the Loran-C position fixing system.
Figure 4	Illustrates the potential Loran-C signal coverage projected to be available worldwide in the mid 1990s. Within the solid line contours (groundwave) accuracies of tens to hundreds of meters are achieved. The dashed contours indicate usable (skywave) but less accurate--0.5 to 1.5 nautical miles--operational signal coverages. Conservative contours are presented by assuming worse case atmospheric noise situations and user equipment (receivers) which barely meet minimum performance standards.


U.S.S. AMERICA TRANSITING THE SUEZ CANAL

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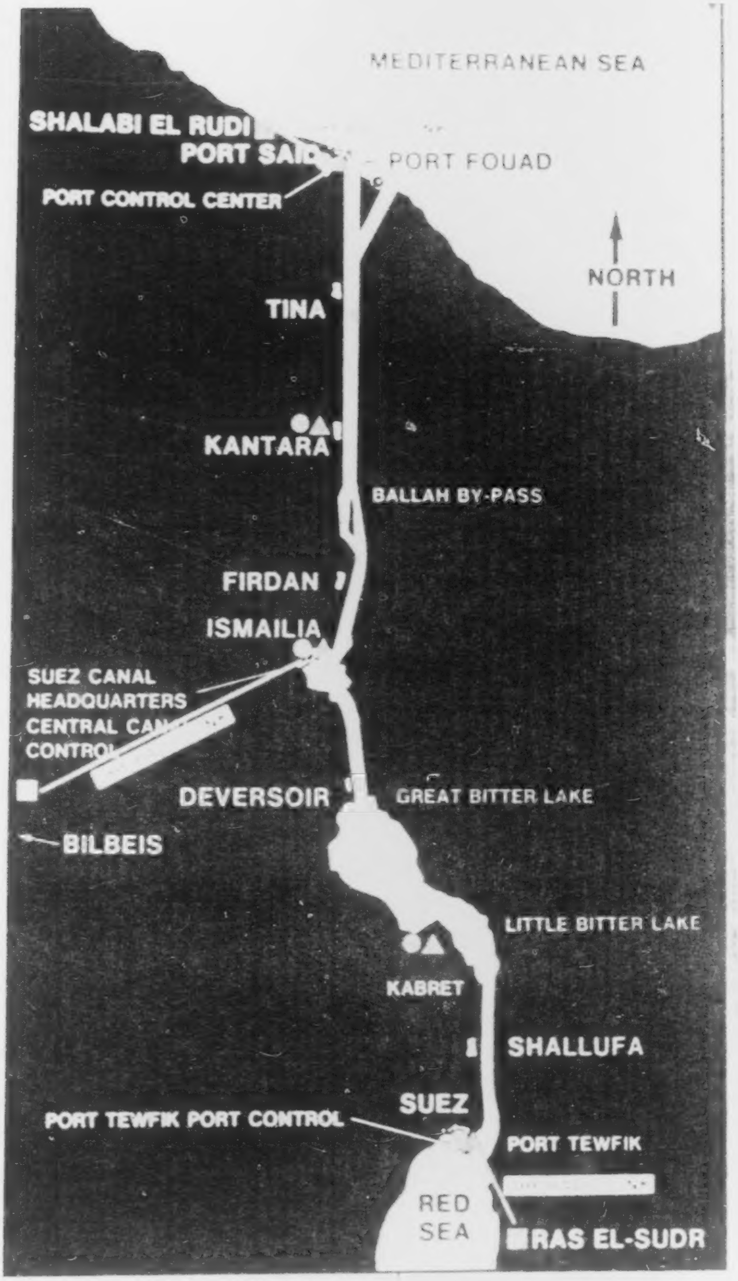
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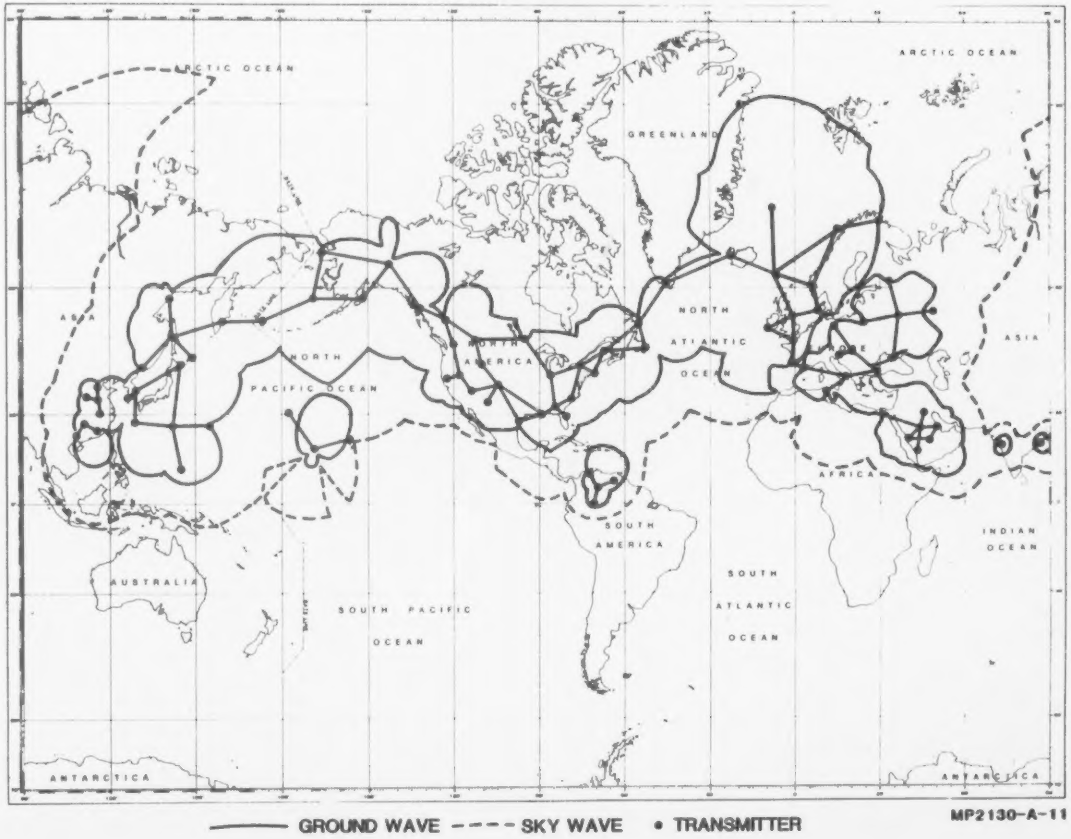
LORAN-C COVERAGE DIAGRAM
NEAR FUTURE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MP2130-A-11

Mr. **Torricelli**. Thank you Mr. McGann. That was very helpful. Captain William?

Mr. **Williams**. Good morning Mr. Chairman and Committee members. My name is Captain Oliver Williams. I am a graduate of the California Maritime Academy and have spent all of my professional career in marine transportation. I am currently Senior Advisor Maritime Affairs for ARCO Marine, Inc., a wholly owned subsidiary of Atlantic Richfield Company.

ARCO Marine owns and operates ten U.S. manned and flagged tankers, all engaged in the transportation of crude oil, and we at ARCO are very proud of our safety an environmental record in operating these vessels.

The marine industry has had safety and environmental problems over the last few years. The industry recognizes this and is working to correct the problems.

I estimate that 90 percent of all marine accidents are caused by human failure and most of these accidents occur in harbors or in the approach to the port. A vessel traffic service that is professionally operated with state of the art equipment and with mandatory vessel participation and, when necessary, mandatory vessel control, would contribute to making vessel traffic safer in our ports.

There is some resistance in the marine industry to supporting the VTS systems that would include mandatory vessel participation and mandatory vessel control. This dates back to the maritime tradition that the master of the vessel answers to no one. This must change. The bridge team concept where everyone contributes to the operation of the vessel must be used, and mandatory navigation commands by a vessel traffic controller would be part of this change.

Many ports in the world have vessel traffic services that far exceed anything found in the United States, and an excellent example of this is the Port of Rotterdam. The Port of Rotterdam has a high volume of vessel traffic with about 75,000 seagoing vessel movements per year and employs about 375 pilots.

Their VTS system has a network of 26 radars, and each radar has its own tracking system. The tracker calculates every three seconds and the data is sent by telephone line to the real-time computers in the traffic center. The computes combine the information from the different trackers into one picture on the control centers radar screens. Also, raw radar video is transmitted by microwave and co-axial cables and is also shown on the radar screens.

Three coastal radio direction finders automatically pick up vessels reporting in by VHF radio, and the bearing information is sent by telephone lines to the traffic center. This makes it possible to identify vessels on the radar screen. They also use some television coverage, and the whole VTS system has an excellent VHF radio communication system.

The normal practice of the Rotterdam VTS is to provide information to the Captain or pilot on the traffic situation, intentions of other vessels, the ship's position if necessary, and other relevant information. The Captain remains responsible for navigating his vessel, making use of the information provided. Under special circumstances, the VTS control center will give binding orders to the vessel.

All vessel traffic services in the United States should be under U.S. Coast Guard control. The VTS should have sophisticated equipment similar to that in Rotterdam, that would allow for communicating, tracking and controlling of vessels. The operators must be properly trained and maintain a good working relationship with their counterparts aboard the vessels. This will require adequate federal funding of the Coast Guard and funds should be actually designated for the operation of the various vessel traffic services.

I believe that vessel traffic services that are properly equipped and manned can be a real contributing factor in reducing marine vessel casualties.

That concludes my formal remarks Mr. Chairman. I would like to thank you on behalf of ARCO for the opportunity of appearing before your Committee today. I would be happy to answer any questions.

[The prepared statement of Captain Williams follows:]

TESTIMONY OF

CAPTAIN OLIVER F. WILLIAMS

SENIOR ADVISOR MARITIME AFFAIRS, ARCO MARINE, INC.

before the

SUBCOMMITTEE ON TRANSPORTATION, AVIATION AND MATERIALS

U.S. HOUSE OF REPRESENTATIVES

ON

VESSEL TRAFFIC SERVICE (VTS)

FIELD HEARING

NEW YORK, NEW YORK

JULY 30, 1990

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I estimate that 90 percent of all Marine accidents are caused by human failure, and most of these accidents occur in harbors or in the approach to the port. A Vessel Traffic Service (VTS) that is professionally operated with state of the art equipment, and with mandatory vessel participation and when necessary mandatory vessel control, would contribute to making vessel traffic safer in our ports.

There is some resistance in the marine industry to supporting VTS systems that would include mandatory vessel participation and mandatory vessel control. This dates back to the Maritime tradition that the Master of the vessel answers to no one. This must change. The bridge team concept where everyone contributes to the operation of the vessel must be used, and mandatory navigation commands by a Vessel Traffic Controller would be part of this change.

Many ports in the world have Vessel Traffic Services that far exceed anything found in the United States, and an excellent example of this is the Port of Rotterdam. The Port of Rotterdam has a high volume of vessel traffic with about 75,000 seagoing vessel movements per year and employs about 375 pilots.

Their VTS system has a network of 26 radars, and each radar has its own tracking system. The tracker calculates every 3 seconds and the data is sent by telephone line to the real-time computers in the traffic center. The computers combine the information from the different trackers into one picture on the control centers radarscreens. Also so-called raw radar video is transmitted by micro-wave and co-axial cables and is also shown on the radar screens.

Three coastal radio direction finders automatically pick up vessels reporting in by VHF radio, and the bearing information is sent by telephone lines to the traffic center. This makes it possible to identify vessels on the radar screen. They also use some television coverage, and the whole VTS system has an excellent VHF radio communication system.

The normal practice of the Rotterdam VTS is to provide information to the Captain or Pilot on the traffic situation, intentions of other vessels, the ships' position if necessary, and other relevant information. The Captain remains responsible for navigating his vessel, making use of the information provided. Under special circumstances the VTS control center will give binding orders to the vessel.

All Vessel Traffic Services (VTS) in the United States should be under U.S. Coast Guard control. The VTS should have sophisticated equipment similar to that in Rotterdam, that would allow for communicating, tracking and controlling of vessels. The operators must be properly trained and maintain a good working relationship with their counterparts aboard the vessels. This will require adequate federal funding of the Coast Guard and funds should be actually designated for the operation of the various Vessel Traffic Services.

I believe that Vessel Traffic Services that are properly equipped and manned, can be a real contributing factor in reducing marine vessel casualties.

That concludes my formal remarks, Mr. Chairman. I would like to thank you on behalf of ARCO for the opportunity of appearing before your Committee today. I would be happy to answer any questions.

CAPTAIN OLIVER F. WILLIAMS

Graduated from the California Maritime Academy in 1954, with a BS in Navigation and Nautical Science. Served two years U.S. Army, one year as Warrant Officer, Transportation Corp. Sailed thirteen years as a Merchant Marine Officer, three years of which were as Master. Have a United States Master's License with First Class Pilotage for San Francisco. Mooring Master experience Gaviota and Ventura, California.

During the last twenty years, have held marine transportation staff position as Assistant Operations Manager, Marine Superintendent, Manager Vessel Personnel, Port Captain, and Senior Adviser. Have served on various AIMS, API, OCIMF, and PMSA committees, including past Chairman of the Watchkeeping and Training committee of the Oil Companies International Marine Forum (OCIMF); and Chairman Operations Committee, Pacific Merchant Shipping Association.

Past Director (1980-1981), Board of Directors, Philadelphia Maritime Exchange. Have participated at IMO sessions on Standards of Training and Watchkeeping (1976), as a representative of OCIMF.

In 1984 prepared a study on Arctic Tanker Routes for icebreaker LNG ships from Prudhoe Bay, Alaska to Japan. Spent a week in 1986 at the Wartsila Arctic Research Center, Helsinki, Finland, performing ice model test for tankers moored to an SPM.

In 1986 wrote a transshipment study that provided the means of transporting liquified natural gas (LNG) from the Alaska North Slope to Japan. By using an ice-breaking Arctic LNG Ship (ALNGS) from the North Slope to the Aleutians and transshipping to a non ice-breaking LNG vessel for the balance of the voyage to Japan.

Marine consultant to the P.T. Arutmin Coal Project, Indonesia (1985-1986); Guasare Coal Project, Venezuela (1986-1989); and the East Greenland Oil Exploration Project, Constable Point, Greenland (1987-1990).

Professional paper published U.S. Naval Institute Proceedings. Presently employed in the shore staff position as Senior Advisor, Maritime Affairs, ARCO Marine, Inc.

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Mr. **Torricelli**. Thank you Captain, thank you for being with us. Mr. Braithwaite?

Mr. **Braithwaite**. Mr. Chairman, distinguished members of the Committee, good morning. I am Tom Braithwaite from Sperry Marine. We are a Charlottesville, Virginia based company, a subsidiary of Newport News and one of the largest suppliers worldwide of shipboard electronics, both commercial and military.

Mr. **Torricelli**. You are a subsidiary of Newport News Shipbuilding Company?

Mr. **Braithwaite**. Yes.

Mr. **Torricelli**. I didn't know that.

Mr. **Braithwaite**. A Tenneco company. I have been with Sperry Marine for nine years and I have had the opportunity to go around the world and become involved in many of the vessel traffic systems in the Far East, Europe, Middle East, and it is a pleasure for me to appear here today to discuss the importance of VTS in the prevention of collisions and groundings.

As a company we are very concerned and feel that a two pronged approach to the problem is in line. The vessel traffic systems and such items as double hulls and double bottoms being the preventative phase, and good clean up procedures for the second phase.

Before I begin, Mr. Chairman, let me publicly commend you for all you have done in Congress to improve our environment and particularly regarding the port and tanker safety issues. I think that we also applaud the New York/New Jersey delegation and members of your Subcommittee for leading the effort in Congress to prevent further contamination of our ports and coastal areas.

The basic vessel traffic systems as we know it started in 1948 when the port of Liverpool England put in a Sperry radar system and since that time, there has been a tremendous amount of development and the technology that leads towards vessel traffic. In particular, not only does radar coverage provided around the world for these systems, but the computer processing that now is used is quite formidable.

The vessel traffic system that has been noted here already differs from the air traffic control, but I think the importance of vessel traffic needs to be re-emphasized with respect to the maneuverability of our ships. What we are trying to do is prevent these ships from getting into a position where they could have near misses or potential collisions because of their lack of maneuverability. One of the things that we have tried to stress recently is the ability to have the vessel traffic system with what we call the big picture and it has been talked about here already. A composite overview similar to what air traffic control people have and typically they use large screen, high resolution color displays nowadays. Around the world we have seen that they have all moved into this technology over the last seven or eight years. The basic systems of having one radar and one radar operator are rather passe now. Signal processing being what it is allows us to feed the information into the computer and allow one operator to be able to have an overview that is a composite display from many radars. Such a system is now used that we provided to the largest oil port in the U.K., Milford Haven in Wales, and that system was installed in 1986 and has performed almost flawlessly since then.

I do note that the U.K. in particular has a lot more autonomy on its ports. The main impetus that has been pointed out here already is for safety and profit for the port and when they install such a system, the cost of it is already included in the normal port fees.

Similar systems to what we did in Milford Haven are now being installed for a Middle Eastern country for a very strategic point in the Arabian Gulf, and we also have a system currently being installed for the U.S. Navy in St. Croix for monitoring of their torpedo ranges. Once again, both of these categories of people have done this for safety and efficiency.

The systems that we see nowadays are very modular. They allow for expansion, they are very flexible and I think a lot of the key to that is the computer networking that has allowed the local area networks inside of the vessel traffic center to provide the information to several operators.

Extensions of these networks are now being talked about for users outside of vessel traffic, people such as Customs, D.E.A., search and rescue work, whether it be clean up operations even.

It is encouraging to see that we are finally getting to the point where we are going to modernize what we have in the United States. The Coast Guard is going to need legislation and funding because they are going to move into an area of much more professional and demanding work. Most of the ports that we have talked to I think are encouraged and looking forward to a first class vessel traffic system. However, it has also been pointed out that those ports if they were to start charging user fees would probably wind up with a competitive disadvantage until such legislation and safety requirements were applicable for all of the ports in the United States.

Even if the accident rate is low, the accidents that we see, of course, are devastating so I think some steps are definitely in order.

I was going to talk a little bit about what a VTS is and many people have pointed this out but I see it and agree with the Coast Guard it contains a good communication system so that you can talk to your ships, it contains a radar system so that you can have the eyes to look out and see where people are working, and direction finder systems, as has been pointed out, that will allow you to identify people when they talk on the radio.

The digital processing associated with the radar is something that is relatively new. It is a very, very important part of the system. It allows the information to be brought from each of the radar sites back to the vessel traffic center without the use of expensive microwave systems and that is a significant decrease in the cost of both installation and maintenance for these things.

At this point, I would like to give a demonstration of how a vessel traffic systems works. We have an eight minute video tape if time permits, and would like to show what Milford Haven has and how they bring a ship into port.

Mr. TORRICELLI. I would like to see it, go ahead.

[Video tape presentation]

[The prepared statement of Mr. Braithwaite follows:]

STATEMENT OF

THOMAS E. BRAITHWAITE

PROGRAM MANAGER
VESSEL TRAFFIC SYSTEMS
SPERRY MARINE INC.

BEFORE THE

SUBCOMMITTEE ON TRANSPORTATION, AVIATION, AND MATERIALS
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY

U.S. HOUSE OF REPRESENTATIVES

REGARDING
VESSEL TRAFFIC SERVICE

JULY 30, 1990

Mr. Chairman and distinguished members of the Committee, I am Tom Braithwaite, Program Manager of Vessel Traffic Systems for Sperry Marine Inc.

Sperry Marine is a subsidiary of Newport News Shipbuilding and a world leader in the manufacture and supply of marine electronics systems and services. Established in 1910 by Elmer Sperry, the company now has 34 facilities in 11 countries. To augment these locations, Sperry Marine, headquartered in Charlottesville, Virginia, manages a network of over 200 distributors who offer expert factory-trained product support in every significant seaport. As the world's largest manufacturer of electronic maritime instruments for bridge and vessel control and navigation, Sperry Marine equipments are supplied to thousands of international commercial ship owners, defense establishments, pleasure craft, sea exploration operators, and various other users.

During my 9 years as Program Manager, I have surveyed many of the vessel traffic systems throughout the world and developed a wide range of technology to meet the conditions experienced. I have managed the build and installation of systems in the Middle East, South America and Europe. Prior to my work at Sperry I spent a career as an electronic and shipboard specialist with the U.S. Coast Guard and retired with the rank of Commander.

I am accompanied today by Mr. Wayne Humphreys, our Manager of Washington Operations.

It is a pleasure for me to appear before you today to discuss the importance of Vessel Traffic Systems in the prevention of ship grounding and collisions. Sperry Marine is most concerned with our environment, particularly the fragile coastal waterways and wetlands and feels that a two pronged attack must be made to preserve our environment. First, improved systems such as VTS and double hulls must be incorporated to prevent collisions and oil spills. Second, improved response capability to contain and clean oil spills must be readily available. My thrust today will be to respond to the focus of this hearing--Vessel Traffic Systems.

Before I begin Mr. Chairman, let me publicly commend you for all you have done in Congress to improve our environment, particularly regarding port and tanker safety issues. You have led the fight in the House of Representatives on environmental issues such as double hulls and double bottoms-putting emphasis on prevention first and then cleanup if required. We applaud you as well as other members of the New York/New Jersey delegation and members of your Subcommittee for leading the effort in Congress to prevent further contamination of our ports and coastal areas. In particular, we are pleased that the delegation has added funds to the budget for a VTS in New York harbor.

Vessel Traffic Systems have been used to assist shipping and bring a higher degree of safety and productivity to port operations ever since Liverpool England first installed a Sperry radar system in 1948. Over the years the technology has allowed not only remote radar coverage but computer enhancement to the operation of both large and small ports.

VTS differs from Air Traffic Control in that it normally serves to advise and not direct the user. Nevertheless, timely information to the mariner just as to the aviator can often make the difference between safety and disaster. Large ships in particular need significant advance notice because of the lack of maneuverability. Predictions of ship position and possible collision allow the mariner to take action to avoid the development of dangerous situations.

It is not uncommon for a ship entering or leaving a port to find that surveillance from his own radar is limited and not until he clears the obstruction can he see what he will encounter. This scenario does not allow avoidance of tricky passages or extreme measures. The VTS can serve as an advisor because it has "the big picture" as well as the details.

In todays modern systems, which are common throughout the industrial nations of the world, the VTS has literally just that. One large high resolution color display is supplied to each VTS operator and this allows him to see the entire area of surveillance and instantly zoom into a specific situation for great detail.

A basic VTS includes total radio communication and radar coverage of the area for which it is responsible. One but not the other is similar to a handicap of sight or hearing. Prior to the 1980's radar displays were treated as individual units and each one required a separate operator. With the advent of affordable signal processing, information about each ship is taken from the radar and digitized for computer processing. This has opened a new world of options for Vessel Traffic Services. With the exception of the USA, this computer enhanced display, with its associated alarms and alerts to prompt the operator, is widely used today.

Since the geography of each port is dramatically different, radar coverage necessary to see all of the ship activity may vary as to quantity and quality. In the previous generations of VTS the best an operator could hope for was a radar display that could be switched from one radar to another. This is akin to watching a golf match with cameras on each tee selected for viewing one at a time. If one concentrates, a mental picture of where each golfer is playing allows the viewer to understand the tournament. An overhead camera however with zoom capability can easily show the "big picture" and closeups. Similarly, by combining all the radar information or data into the computer and allowing it to generate the overview of the port, the operator is provided with the equivalent of an electronic chart with ships moving at their exact locations. More important, the computer now has data on all of the ships courses and speeds which can be used to predict problems.

The Sperry Marine video tape supplied to the committee demonstrates such a system provided for the port of Milford Haven in Wales UK, which is the largest oil port in Great Britain. This system was developed in the early 1980's and installed in 1986. Since then it has performed almost without flaw and is directly attributed with the avoidance of numerous accidents. Needless to say the system has paid for itself many times over.

In the UK, ports have more autonomy and each has set some kind of VTS in place to make the port both attractive from the safety point of view and to increase the efficiency and hence profits. The productivity of a port is measured by the throughput of cargo even in reduced visibility or inclement weather.

A similar system is currentlyt being prepared for a Middle East country to upgrade a previous Sperry Marine system installed in 1983 and used to monitor a strategic area in the Arabian Gulf. Likewise we are now installing a system in St. Croix Virgin Islands for the U.S. Navy tracking range. These radar systems are intended to improve range safety and operational efficiency.

As I have stated before, these systems around the world vary in complexity and expanse of coverage. This makes it difficult to place a price on a port because none are typical. Small ports with only one radar vary in price from $100K to $600K. Medium size ports can have from 2 to 6 radars and may range in price from $1M to $5M. The large ports like Hong Kong, Singapore, and Rotterdam may reach costs of $20M to $60M. Specifications for equipment and features can swing the cost by an order of magnitude.

Fortunately, the systems today are modular and allow flexibility and expansion as the port develops. Computer networks are currently the key feature used to allow all of the operators to share information and hand off the coordination of each ship as it passes through the area. These local area networks are normally contained within the operations center but more and more of the VTS's are starting to share information with other agencies. The marine police, harbor fire units, and Customs are just some of the activities that can both give and retrieve information from the VTS computers.

In this country, the extension to drug traffic detection, search and rescue, and oil spill cleanup coordination are just some of the operations that can benefit by extending the computer networks. In Europe studies have been going on for some time to determine the best way to link VTS information from one port to the next regardless of the nationality of each. I suspect that after 1992 implementation of such schemes will be common. These wide area networks are a logical outgrowth of todays technology and it means the mariner would not have to repeat the same information to each VTS as he makes his journey.

It is encouraging that we in the United States will soon place into services modern systems to replace those installed in the 70's. The Coast Guard needs the support of both legislation and funding to tackle a job which will be significantly more comprehensive than before. The use of modern technology will allow better service to the shipping industry and this will encourage participation and cooperation.

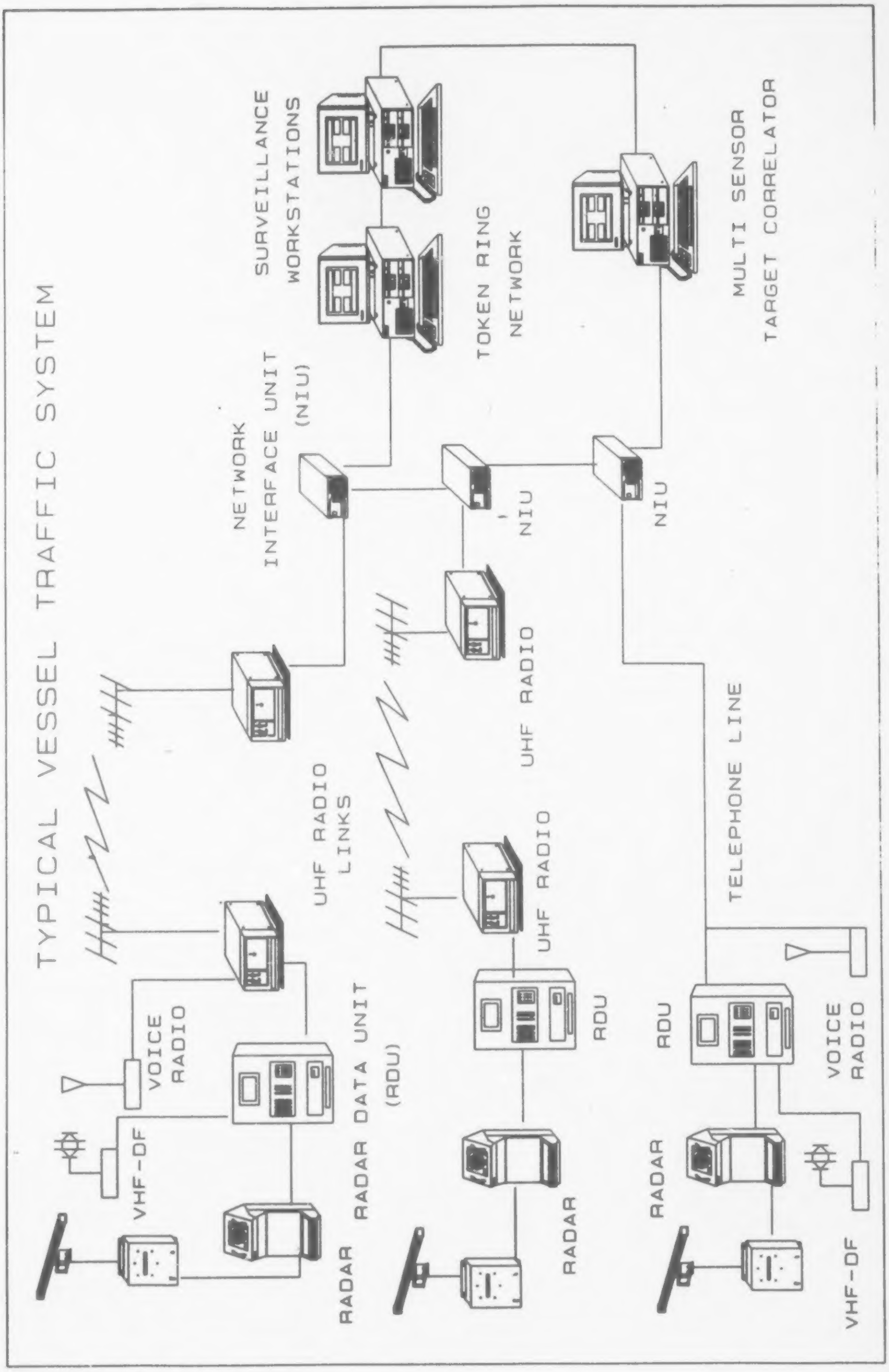
My observation lately is that many ports are anxious to have a first class VTS. Even the pilot associations are starting to accept the fact that a properly designed system manned by professional mariners can help them. Today, there is no reason why the Pilot's office cannot have a display of their own fed from the VTS. In fact VTS is a logical extension of port pilotage. Ships checking in with the VTS would be coordinated for efficient rendezvous with the pilots and the radar tracking would allow verification of ships position at any time.

If Congress mandates the use of Vessel Traffic Service and provides the funding needed to establish effective systems, the environment and the shipowner will both benefit. We should no longer bury our heads and pretend that accidents won't happen. Even if the accident rate is low the consequences to the environment and the economy are devastating.

Ever since the Valdez accident the concept of improved VTS has been discussed at many levels of government and industry. Although these systems have been around for a long time the concepts and technology are foreign to most.

What is VTS?

As I stated before these systems come in various sizes and complexities. A typical medium size system may contain 3 or 4 sites linked together by a data communication network of telephone lines or radios. The functional block diagram shown on the next page depicts three remote radar sites under


TYPICAL VESSEL TRAFFIC SYSTEM
RADAR
VHF-DF
VOICE RADIO
RADAR DATA UNIT (RDU)
UHF RADIO LINKS
NETWORK INTERFACE UNIT (NIU)
SURVEILLANCE WORKSTATIONS
RADAR
UHF RADIO
UHF RADIO
RDU
NIU
TOKEN RING NETWORK
RADAR
RDU
TELEPHONE LINE
NIU
MULTI SENSOR TARGET CORRELATOR
VHF-DF
VOICE RADIO

direct control of an operation center which receives all of the ship target data from each and displays it on one or more VTS operator workstations. In addition, a voice radio communications subsystem is used to talk to each of the participating ships and if necessary raise a call to those ships in the area that have not checked in. The use of two or more radio direction finders shown at remote sites can also be used to identify rogues or unidentified targets that show on the radar screen. When they talk on the radio, the bearing line to each is superimposed on the radar display and a match allows the operator to identify the ship. This technique is commonly used in Europe and the Far East.

The system uses high speed digital processing at the radar site to reduce necessary information so it can be carried over inexpensive telephone links rather than costly broadband microwaves. This innovation alone has reduced acquisition and installation costs by about 30%. As more systems are placed into service each year the cost will continue to drop due to economy of scale. The number of VTS's worldwide is growing every year and many old systems such as those in this country are being replaced with this new generation of equipment.

The technology at the remote sites is key to the success of a good system but if designed properly the remote sites are transparent to the operator. All he uses is his computer generated display and his interface with the computer which provides the greatest benefit for timely action and response.

How does the system actually operate in practice?
I think the easiest way to explain this is to show the video tape of the operation in Milford Haven at this time.

As you can see from the video, the operator tasks have been greatly simplified by the use of computer generated menus and selection by a touch of the finger to the screen. We now have the next generation of VTS display which is faster and even easier to use. This also simplifies the training of operators, a subject which will be crucial for systems run by the Coast Guard since personnel turnover has historically been high at the VTS centers.

What are the benefits?
In case it is not apparent there are other potential benefits to VTS besides the obvious shipping coordination and safety.

- Historical record

The entire list of targets can be recorded on the computer storage for retrieval and playback at a later date. This allows analysis of accidents or close encounters to determine fault and allow procedures to be modified for future operations.

- Enhanced training

The most common practice is to arrange a VTS center with one extra console which is dedicated to the training of new operators. This console can in fact be linked through the computer network to have live data and yet not interfere with ongoing operations.

- Top Management overview

By extending the network over additional telephone lines the agencies key decision makers such as the Secretary of DOT, Commandant USCG, or National Transportation Safety Board can have access to all of the latest information and situation displays. This removes a level of confusion when management has these situations interpreted and described by third parties.

- Inter-agency sharing

In the case of multi-agency operations the one composite display available to the VTS can be shared over telephone lines to any other participating activities. This common database serves to remove misunderstanding and builds a team approach.

Some examples of multi-mission use were discussed before. Such additional items as harbor security, dredging and construction, and special operations should be mentioned since they impose additional work on the port resources and increase the level of danger to shipping.

How are these funded?

In most ports outside of North America the port fees normally cover the cost of essential services and that includes VTS. The idea of user costs strictly identified with VTS could place a port in this country at a disadvantage until all of the ports are in compliance with the same safety standards. In Canada the costs are absorbed as part of the national budget in line with their priorities for safe shipping. VTS has been referred to as insurance against an accident but I prefer to think of it as preventative medicine. If one accident can be avoided, the cost of the VTS is easily justified in the same manner that Air Traffic Control justifies the avoidance of mid-air collisions.

In conclusion and speaking not only for Sperry Marine but also a concerned citizen with a respect for our waterways I urge that steps be taken soon to afford this country the same capabilities as in Canada, Europe, Far East and Middle East to prevent problems before they happen. From my experiences with the Port Authority in Milford Haven I know that the one situation in a million can, in fact, happen. There are several instances where the VTS operator was able to avert disaster.

Today's technology is flexible and will allow for growth. In the case of Cooperative Vessel Traffic Systems, each of the ships that normal use a port are equipped with special communication devices for reporting. The radar based system can also accommodate this information. These systems are often based on the GPS or Loran position fixes obtained on board the ship and then passed to the VTS center either randomly or on demand. The merging of radar data and the cooperative reports provides even better information to the user. One future expansion possibility for the cooperative system is the retransmission of the composite port picture back over the data link to the ships. This would allow the major ships to have a duplicate view to the VTS operator. Flexibility and expansion of concepts such as this will allow the our ports to operate in a modern safe manner.

In this country, because all of the VTS is operated by the U.S. Coast Guard we also have the opportunity to achieve standardization in both equipment and procedures. This is not normally possible in Europe and other areas because of the independence of the various ports. We however can invoke standards if a multi-year commitment is made by government. The Port Needs Study now underway is a step in that direction.

Mr. Chairman, I thank you for the time allowed to me and hope that I have been able to shed some light on the concept of VTS both here and around the world. I also hope that in the near future we will see appropriations for upgraded automatic digital processing equipment throughout the existing Vessel Traffic Systems to provide for course prediction and collision avoidance.

Mr. TORRICELLI. Mr. Braithwaite, thank you very much. It was very interesting and it was exactly the kind of thinking that has led to this hearing. Mr. Rohrabacher has some time constraints so I am going to let him go first and we can proceed now. I thank you each for your testimony.

Mr. ROHRABACHER. Okay, very quickly, Captain Williams, do you believe that the drug and alcohol testing among tanker captains generally is acceptable now or should that be something that we should be looking at as a way of preventing accidents?

Mr. WILLIAMS. Well, I think it is acceptable now. We have Coast Guard regulations that provide for pre-employment testing for drugs, periodic testing for drugs, reasonable cause testing for drugs, and post-accident testing for drugs and alcohol. The random drug testing was put on hold by a federal court order and new regulations will be coming out shortly. So, I think that these regulations pretty well cover it.

Mr. ROHRABACHER. All right.

Mr. WILLIAMS. Some companies have gone beyond that, and we have gone beyond that, and we test our masters prior to leaving every port with a breathalizer for alcohol.

Mr. ROHRABACHER. You mentioned basically you disagreed with earlier testimony that talked about who should actually be in charge of the ship in making decisions, whether it should be — we need some revision of the age old captain is the guy who is responsible, versus the more team approach which would include decision making from a VTS or whatever group is actually controlling the situation from the shoreline. Perhaps you could expand on that a little bit more — is this — have we come to a point now where the captain doesn't have to be the sole master of the ship?

Mr. WILLIAMS. We believe that that is true, the master does not have to be sole person in control. We must have a VTS system with state of the art equipment and properly trained people. On the Rotterdam system, all of the operators have marine experience. They actually have five control centers, two are sub-centers to the main three sections. The one that is the most seaward control center, there is a pilot there, twenty-four hours a day in that control center.

Mr. ROHRABACHER. But the captain—but you would suggest that the system be modified so that the captain then does not have the final word as to what his ship is going to do in terms of direction, et cetera?

Mr. WILLIAMS. That's correct. When necessary, the traffic controller should give mandatory orders to the vessel, that is correct.

Mr. ROHRABACHER. All right. I spent some time in the South Pacific and you might have spent that time — maybe visited the same area on the Spira Tusonto (phonetic) which is an island that was a major staging area for World War II, and there was a very famous ship that sunk in the harbor there, the President Coolidge, and the story goes that the ship was coming in and the captain waited and he was ordered by the controllers to go forward and he kept — apparently there was a bit of discussion back and forth and the captain realized he was in an area with lots of mines and he was ordered forward and he struck a mine and the ship sank and just by a miracle we saved 5,000 troops that were on board that ship. I am just saying that as—the captain was, in the end, responsible, whether or not that person gave him the orders from the shore or not, he was responsible in the end. Would modifying responsibility of the captain, you are saying that that would actually help prevent accidents in the future?

Mr. **Williams**. The captain still has responsibility the same as the captain on an airliner. If he sees a small aircraft coming across his path, he does not continue on his path and hits that other airplane. He still has responsibilities but I believe that a VTS, proper state of the art equipment and properly trained people which we have none in the United States, could greatly assist in avoiding collisions and so on in U.S. ports and, when necessary, they would give binding orders. Yes sir.

Mr. **Rohrabacher**. I see that this will probably be a very extensive debate and I am looking forward to hearing your participation and other's participation as to whether or not that would be the best approach. Just one final question and this is directed to the two gentlemen here. There was little talk about cost effectiveness and just very, very briefly, would a system based on GPS be as cost effective as the Loran-C system which Mr. McGann suggested that today it certainly wouldn't be according to that testimony, but how do you feel about the cost effectiveness of the GPS system in the future?

Mr. **Denaro**. I think the cost effectiveness of the two systems is very similar. Remember, the cost of maintaining the system is being footed by D.O.D. for their own purposes right now, so I don't think that flows down to the ship operators. GPS is not exactly a household word yet but the prices are coming down dramatically. A case in point, there are two auto makers at least right now in Japan who are putting GPS into automobiles and that is the chosen system for that. It is generally acknowledged that within the next twelve to eighteen months, in order for their to be a market for GPS in the common automobile, the price to — when you go to the showroom, you need to pay no more than an air conditioner price for a GPS, so yes, those price are very comparable.

Mr. **Rohrabacher**. Okay, but a VTS system based on the global positioning system would require different types of equipment, would it not?

Mr. **Denaro**. Well, there the concept which we call dependent surveillance of either Loran or GPS is about the same. The comparison is with a radar only system where you would attempt to cover the entire coverage region with radar only. I testified in a hearing similar to this in California and when asked the price of the New York VTS upgrade with all the radars and were given the number I think $15 million was quoted, the California representatives laughed at that and said there is no way they are going to put that in Santa Barbara or something like that, so we are really talking affordability with respect to radar. For the price of GPS or Loran based systems, I think would be similar, and the distinctions of why you would use one or the other are actually somewhat more subtle. My personal opinion is that you use both. You have got Loran on those ships right now. GPS may become the system of choice for deep ocean and so forth, so let's use both systems. Dependent surveillance, if you have both, you have good back up and cross checking, otherwise you have gone one or the other.

Mr. ROHRABACHER. Mr. McGann do you agree with that?

Mr. MCGANN. Yes, I think Bob makes a good point that the overall cost and whatever of the VTS system as a system, including all of the displays, the people, the training, the communication and so forth. The interchange of one or more sense of Loran or GPS is not going to change very much at all so the choice of that is not made on that basis. Each of them are going to be a few hundred dollars or $1,000 on the vessel and so forth, so on that basis, it really should not be the point of discussion. The other discussion that I had really was pointing out that the choice — the role of GPS in the mix of radio navigation systems in the United States and in the world is not yet certain because there are some very large questions of liability and responsibility and cost, and the billion dollar figure that I mentioned to you took the role that said what if we don't have the D.O.D. paying the bill — should we introduce and become dependent on a GPS system which would then cost us as taxpayers and the Department of Transportation a very large amount of money. Do we need it — what role does it play?

Mr. ROHRABACHER. Do you mean maintenance costs, is that what you are talking about?

Mr. MCGANN. Yes, the on-going cost of operation and so forth. An interesting question came up two weeks ago at the International Association of Lighthouse Authorities. The question came from the floor asking a panelist from the Coast Guard, "Is the United States going to formally recommend GPS as a world wide radio aid to navigation?" and the Coast Guard representative I think very correctly said that, "The United States has not decided on that and does not have a posture." The IMO, the International Maritime Organization, representative got up after that and said, "We would wish to remind you that if in fact the United States does present GPS as a world wide system, then one of the IMO requirements for acceptance is that the United States then will ensure the integrity of that system worldwide." I felt it necessary then to stand up and say, "Well, as a taxpayer, I frankly wouldn't think the United States' taxpayers are going to feel good about paying a billion dollars to put the system—per year, to operate the system", and then have to ensure the integrity by measuring the signals at every place in the world, and then going beyond that to inform every category of user in a time frame appropriate for his application and then going beyond that, by assumption, saying if you don't do that, you have the liability of it. I wonder if the U.S. taxpayer wants to do. So the questions are not really at the sensor level or the technology level, they come at the legal level of liability, they come at the cost level of system management, but from a sense or point of view and I think Bob and I agree, if we have got it, we should use the two of them. It is not going to change very much. In the interoperability of systems, the prudent mariner uses whatever he has available, whether it is two, or three or four.

Mr. ROHRABACHER. That is the end of my questioning. I would like to apologize that I am going to have to leave. I have got to be in Washington, D.C. and I understand it is not easy to get across town once it reaches noon so I am going to have to take off.

Mr. **Torricelli**. Your error is that you should be flying out of New Jersey and going to Newark.

Mr. **Rohrabacher**. But I want to thank you all and thank you Mr. Chairman for giving me this opportunity.

Mr. **Torricelli**. Thank you Dana for coming and for you attention and time and questioning. Mr. Braithwaite, from what we now know of the accident in Galvaston, would a VTS system have played a role in preventing the accident that just occurred in the last twenty-four hours?

Mr. **Braithwaite**. I think any time that you have got the possibility of two ships colliding and you can get on the radio and warn one of them that they are standing in danger, I think that that —

Mr. **Torricelli**. This is a classic case of an accident that didn't need to happen.

Mr. **Braithwaite**. I think that anytime you are in open water like that, the vessel traffic system in particular is a tremendous advantage. When you are in a close canal, there is not much room for maneuverability and the best thing there of course is to have the vessel traffic to have prevented the meeting of two ships at a critical juncture, try to make they pass at other places.

Mr. **Torricelli**. When I was out of the room, this may have been asked but did anyone take issue with Captain Williams' beliefs about command of the vessels, understanding that there is a chance, that there is always an override requirement in an emergency situation — are we in general agreement on that issue in designing harbor systems — are we in general agreement? You are shaking your head.

Mr. **Braithwaite**. It is a very, very difficult question and I am sure everybody appreciates that. We have got a long tradition that says the captain of the ship has got a unique responsibility and I think the question is and of course the point here is that he needs help and everybody wants to see that he gets all the advice and guidance that he can get, but I don't know how much responsibility can be relieved from the captain, that is the question.

Mr. **Torricelli**. Well, I take it for business purposes, having somebody else telling you how fast you should go, where you should go and what risks you should encounter isn't bad business. It seems to me like the opening paragraph of the brief for the defense. If we engage with the Coast Guard, NOVA and others, the designs of future systems for American ports based on any one of these technologies, what information should we be requiring is built into a mandatory American system, other than obviously direction and speed — what two way information should be flowing between ship and controller — list for me what it is we should be looking for in the Coast Guard's own analysis and proposal and what might be in a future American design — what should be on that screen as we just saw that Mr. Braithwaite showed?

Mr. **Braithwaite**. I think positive identification is certainly an attribute and the synergism between —

Mr. **Torricelli**. Of the name of the vessel, automatically pulling out of a data pool specifications on the vessel?

Mr. **Braithwaite**. Yes, that data base that would back up your vessel traffic graphics picture I think is an important part of the modern day concepts and we see that happening around the world now, Europe, Far East, they are all going to that type of a procedure. Whether they have computerized the Lloyd's list and put it into their background data or whether they are getting the information ahead of time from the ships that normally use that port.

Mr. Torricelli. For example, you had cargo on there.

Mr. Braithwaite. Yes.

Mr. Torricelli. What is actually showing up what the ship usually carries or specifically from the Port Authority what is anticipated on this particular vessel on this particular trip?

Mr. Braithwaite. You are interested in the specific cargo and it may not come from a data base it may come over the radio and be entered in by an operator on a keyboard so you need the flexibility.

Mr. Torricelli. I see. Otherwise, on both screen is showing up direction, speed, draft — is the actual reading on the depth meters of the vessel also automatically being broadcast?

Mr. Braithwaite. You can do that with a dependent type system. If you are going to have each of the ships reporting in its position from its onboard sensors, whether they be GPS, Loran-C, the information such as depth, heading cargo —

Mr. Torricelli. So depth could also be broadcast automatically by the ship?

Mr. Braithwaite. If you are going to get the two way communication between the ship and the vessel traffic center, then you've got the advantage of data interchange and you might as well get everything that they have got. Likewise, you possibly could provide to them a composite picture back for presentation on board a display that they would carry on board the ship which would give them the ability to look down at the chart, see themselves, see other ships around them that were beyond their radar coverage.

Mr. Torricelli. Is there anything else anybody would suggest that hasn't been mentioned or shown that we should consider to be integral to a system of this design?

Mr. Williams. I have a question — do you mean a system where you are going to be able to control vessels or just advise vessels?

Mr. Torricelli. Well, either way. What I am interested in is what shows up on the computer screen.

Mr. Williams. In some ports they had the ability to give the information to the ship of the depths in the harbor, the change in depths in the harbor. I don't believe that we have this capability in any of our systems today.

Mr. Torricelli. So as the ship comes in on its screen, an actual chart is in front of it showing actual depth at that time?

Mr. Williams. They would give it to them verbally, but the port has a running — their computers are continually showing by depth indicators exactly what the depths are in the harbor.

Mr. Torricelli. So, for example, in the screen that is on the monitor now, the port would be broadcasting onto that screen actual depths from sensors at that point in the harbor?

Mr. Williams. That's correct, they would be able to tell the ship what the wind and weather conditions were and what the depths were.

Mr. Torricelli. Does your Sperry system include that today?

Mr. Braithwaite. We have the information in our computer but we do not broadcast it back to the ships. They do not have a cooperative system such as —

Mr. Torricelli. You don't broadcast it.

Mr. Braithwaite. — that because of course there are so many various ships that come in there. You can usually outfit the normal vessels that would come to a port, but the ones that don't normally come in would have to be making some plans ahead of time to get that equipment on board.

Mr. Torricelli. Nevertheless, you can design systems that may broadcast information today which cannot be received, but which over time, the onboard systems come to accommodate it.

Mr. Braithwaite. I think the interesting thing is that we have seen more and more computers going on board the larger ships, integrated bridges. We just did a system for the — now the Exxon Mediterranean, which is a complete integrated bridge, and the computer systems on there will certainly support the data transfer back and forth to the shore base VTSs.

Mr. Williams. The Rotterdam system requires no additional equipment on any vessel, yet they have the ability with light pencils similar to what you are doing here to tell the distance between two ships, closest point of approach, speed, and —

Mr. Torricelli. Do they have alarm systems?

Mr. Williams. I am not sure.

Mr. Torricelli. Should alarm systems be a mandatory part of this kind of a system?

Mr. Williams. Yes.

Mr. Torricelli. Collision alarms, running ground alarms.

Mr. McGann. Yes, control area avoidance.

Mr. Denaro. Mr. Chairman, I might say that the predictive nature of this is very important because ships, they are difficult to maneuver, that predicted calculations such as Mr. McGann is indicating, acceleration and velocity, still one can look again. The analogy again, although this might not be possible right away, the analogy with air traffic control of filing a flight plan or route plan would certainly help so that you know at least the destination of the ship if not the route that is intended to be taken. Also, providing the information — a good place to start with this list of information is what the VTS currently uses in their ports and starting with this list of information and automating it will reduce the work load of those operators at the VTS and make them more effective than managing the traffic situation and not manually handling the data, so that is certainly a place to start.

Mr. Torricelli. What is the level of accuracy on positioning on the GPS system?

Mr. Denaro. GPS accuracy nominally is in the 15 to 20 meter range on the civil signal, however, the Department of Defense is intentionally degrading the system to less than 100 meters, somewhat distributed in that range, so you are guaranteed something less than 100 meters and this is for national security reasons.

Mr. Torricelli. Yes, I understand.

Mr. Denaro. There is some amount of debate on that. Let me just add that differential GPS where you have a local station which is something the Coast Guard is experimenting with right now is well under 5 meters of accuracy and that is within about 100 to 200 miles.

Mr. TORRICELLI. And if we looked at any Coast Guard proposal or other proposals for a system, what standard would you recommend we see as a minimum?

Mr. DENARO. I think the Coast Guard's requirement for harbor, harbor entry is the 8 to 20 meter range and I don't see any evidence that that is not sufficient.

Mr. TORRICELLI. How about update standards and how fast the ship is updated on changing information on positioning or other data, given the speed the ships are entering these harbors and their ability to change positions, what is the rate of update?

Mr. MCGANN. I think it is priority situation, really. It just depends on what type of vessel it is and again emphasizing that it is good to know what type of vessel it is, whether or not it is in close quarters, what speed.

Mr. TORRICELLI. My question is, for example, on a GPS system, you have just received a read out on your position. How fast is that updated?

Mr. DENARO. Well GPS normally can be updated — most systems are updating once a second on board. You could get down to four times a second or more.

Mr. TORRICELLI. And what is an appropriate standard?

Mr. DENARO. Well, as far as reporting back, I think there is some study probably necessary on that. It depends on what phase of the harbor approach you are in and so forth, it might be once every ten seconds.

Mr. TORRICELLI. I am just looking — as we look at a Coast Guard or other proposal and they say that 20 meters is a level of accuracy that must be obtained, there must be an update standard as well, that it must be updated every five seconds, every ten seconds. Is there anything that occurs to anybody we should look for as a minimum — Captain?

Mr. WILLIAMS. Yes, I mean Rotterdam, with just radar of course they have twenty-six of them, they have double coverage, they update every three seconds through their trackers into the computer.

Mr. TORRICELLI. Every three seconds?

Mr. WILLIAMS. Every three seconds.

Mr. TORRICELLI. Do you generally consider Rotterdam to be the state of the art?

Mr. WILLIAMS. Yes, I do. There may be some better ones, I am just not aware of.

Mr. TORRICELLI. Is that a Sperry system?

Mr. BRAITHWAITE. Excuse me?

Mr. TORRICELLI. Is that a Sperry system?

Mr. BRAITHWAITE. No, we did the initial studies and the specifications for that one but it went to Phillips being a Dutch company. But I agree with the three second — that is about the best you can do, the scan of an antenna on a radar antenna is normally three seconds, but with your processing times and data processing and display, three to eight seconds seems to be the world wide norm and what people are shooting for.

Mr. **Torricelli**. What is your guess on a really state of the art system today that is installed on the bridge of a modern tanker, ocean liner — what kind of money are we talking about?

Mr. **Braithwaite**. You are not talking about vessel traffic you are talking about a tanker system?

Mr. **Torricelli**. I am talking about a tanker system but I am talking about the high end of all of this technology, actual screen, if we were broadcasting this kind of information into New York Harbor, to receive all of it.

Mr. **Braithwaite**. Oh, just to receive back the vessel traffic composite display?

Mr. **Torricelli**. Right, on board a vessel.

Mr. **Braithwaite**. You are looking at something under $100,000, certainly.

Mr. **Torricelli**. Under $100,000 to build and receive all of this data on an updated basis. Gentleman, that is all I have. This has been very interesting though, this is exactly the kind of information we are looking for to try to evaluate with Coast Guard, go in with this and what kind of proposals we would like to make ourselves. I take it the idea of a system given today's realities of where we would set a standard, we would set some deadlines, we would choose some technologies, and then have it perhaps levels of development the government share in, but installations obviously on board but also in harbors, paid for on a user fee basis. Does that strike anyone as a difficulty that would not warrant proceeding—appropriate strategy? Mr. Braithwaite?

Mr. **Braithwaite**. I think the user fee is a real hot potato in the sense that the competitiveness between ports is so great and I know the pilots associations that I have talked to feel very strongly that —

Mr. **Torricelli**. But we are not doing this as the City Council. This would be done by the Congress so that simultaneously every port of a certain size in the nation would have to step by step update its technology to get to a certain level. This competitiveness problem in the point of view that you don't come to the United States at all, but if you do, you are in the system. Does it still bother you?

Mr. **Braithwaite**. The phase in I suppose would be difficult, but and depending on the Delta and what the differential would be, has some merit. Canada doesn't do that though.

Mr. **Denaro**. The problem Mr. Chairman is that you are talking to the sellers not the buyers here today, however, I think it behooves all of us both your end of the table and our end of the table to do a good sales job in relaying the economic benefit, the liability benefits and so forth to these people. The alternate long range thinking price of that system on board is going to be less than the alternative.

Mr. **Torricelli**. But they are not getting some concept of the liability at this point, they are not paying attention. But, by the time the state and federal oil spill legislations come into law, it will be painfully clear. What we are suggesting is not only good environmental law, it is simply good business.

Mr. **McGann**. You could suggest though that we not get too focused just on harbors or whatever but entire coastlines, remember that Amoco Gadez and the ARCO Merchant occurred outside any harbor or harbor approach area.

Mr. **Torricelli.** Good point.

Mr. **McGann.** And if we also do it well, we probably will handle a lot of the other situations that I mentioned, enforcement of the 200 mile limit, enhanced search and rescue, common grid for whatever it is, and I think we can do a good deal for that if we handle this vessel traffic system, if you will, in a coherent way, addressing the entire user community and the area.

Mr. **Torricelli.** That's a good point Mr. McGann. Gentlemen, thank you for your testimony. During the course of this debate, as it continues in the coming months and you see developments take place, please contact me or members of the Committee staff with any thoughts or reactions you have to either work you see being done, the movement of legislation, or of government standards. We would appreciate a continuing dialogue on the issue. Thank you very much.

For our third and final panel if we could have Nina Sankovitch, Natural Resources Defense Council, Virgil Keith, President, ECO, Inc., Dr. Eugene Guest, Marine Safety International. I can't help but notice that Virgil Keith—

Mr. **Keith.** I am right here Mr. Chairman.

Mr. **Torricelli.** I was going to declare you absent.

Mr. **Keith.** No, sir, don't do that.

Mr. **Torricelli.** Thank you very much not only for appearing today and offering testimony but also for your patience, what I know can be a lengthy proceeding, but we appreciate very much your help today in offering your own prospectus on the issue. Nina Sankovitch, would you like to proceed please? I will remind you again that we will take your entire testimony into the record and if you would summarize it please, we will proceed from there.

STATEMENTS OF NINA SANKOVITCH, NATURAL RESOURCES DEFENSE COUNCIL; VIRGIL KEITH, PRESIDENT, ECO, INC.; AND DR. F. EUGENE GUEST, DIRECTOR, MARINE SAFETY INTERNATIONAL

Ms. **Sankovitch.** My name is Nina Sankovitch. I am a coastal attorney with the Natural Resources Defense Council in New York. NRDC is a national non-profit organization dedicated to the protection of the natural resources.

Mr. **Torricelli.** I am not sure everybody can hear you so please — our microphones are not of the great assistance.

Ms. **Sankovitch.** Okay. NRDC on behalf of its 130,000 members appreciates this opportunity to offer testimony on implementation of vessel traffic services in New York Harbor. Due to Coast Guard budget cuts, the VTS in New York Harbor was dismantled in July of 1988. It will resume limited operation this September as a result of Congress' response to the Exxon Valdez spill and repeated recommendations by the National Transportation Safety Board.

The VTS as has already been explained today, will be implemented in stages. The first stage of New York Harbor VTS will be will be implemented this September and will institute radar and closed circuit television coverage for moving and stationary vessels in the Upper Bay, Kill Van Kull, and Newark Bay.

The second phase, to be implemented in August 1991, will extend coverage to the Lower Bay, Raritan Bay, Ambrose Channel and the Arthur Kill. Coverage will only be extended to the East River in the final phase to be implemented in August 1992.

It was our understanding that the Hudson would also be covered at this time. Today's testimony did not indicate that the Hudson River will be covered above the Holland Tunnel.

We believe that the VTS should be implemented as soon as possible to cover the Hudson and East Rivers and the entire Arthur Kill, Kill Van Kull area. An examination of spills over the last ten years in New York Harbor led NRDC in its report, "No Safe Harbor", to identify areas particularly hazardous for oil transport due to tricky currents, rocky bottoms, heavy traffic or narrow straits. These areas are the Hudson and East Rivers, known for rocky bottoms and tricky current, the Kill Van Kull and Newark Bay due to rocky bottoms and the close maneuvering required, and the Arthur Kill, a hazard because of the large amount of traffic and oil transfers that take place there.

The most recent spill in the Kill, the July 19th collision of two barges, was just one more illustration of the navigational dangers in the Kill Van Kull/Arthur Kill area. In fact, numerous spills have occurred in the Arthur Kill and in the Hudson and East Rivers. Thus, VTS coverage of this area is vital. The current plan to wait until August of 1992 to extend VTS coverage to the East River and hopefully the Hudson River where five of the nine serious spills in the last three years have occurred is completely unacceptable. Funding adequate to ensure all high risk areas in the Harbor be covered immediately, should be allocated to the Coast Guard.

A key change that has been proposed in the New York VTS is to make it mandatory for vessels to notify the Coast Guard of their presence and movement. In addition, it has been proposed that VTS personnel be allowed to control vessel movements during conditions of traffic congestion, reduced visibility, or other hazardous circumstances. These proposals have not yet been finalized and are likely to face great opposition from maritime industry. Both proposals would improve the effectiveness of the VTS in controlling navigation and in preventing groundings and collisions.

Compliance with the VTS must be mandatory as has been discussed earlier today and I won't comment further. The VTS center should have the ability to control movements of vessels when there is heavy traffic, bad weather and reduced visibility. It must also be able to control movements in narrow channels, or where a vessel has had a history of navigational difficulties.

Thank you again for allowing NRDC to testify today.

[The prepared statement of Ms. Sankovitch follows:]

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Testimony of
the Natural Resources Defense council

before the

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My name is Nina Sankovitch. I am a coastal attorney with the Natural Resources Defense Council (NRDC) in New York. NRDC is a national non-profit organization dedicated to the protection of the natural resources.

NRDC has worked for over a decade on issues of oil spill prevention and cleanup throughout the United States, participating in the development of federal and state legislation to improve prevention and cleanup, and monitoring spills as they have occurred. In March of this year, NRDC released a report, No Safe Harbor, which examined oil transport and transfer in ports around the country, including New York Harbor. In addition, NRDC has carefully monitored the many spills which have occurred in the harbor this year, and continues to oversee the cleanup and short-term damage assessment in the Arthur Kill following the Exxon pipeline leak, as chairman of the Advisory Committee to New York State on the cleanup and damage assessment of the spill.

NRDC, on behalf of its 130,000 members, appreciates this opportunity to offer testimony on the implementation of the Vessel Traffic Service in New York Harbor.

Due to Coast Guard budget cuts, the VTS in New York Harbor was dismantled in July 1988. It will resume limited operation in September 1990 as a result of Congress' response to the Exxon

Valdez spill and repeated recommendations by the National Transportation Safety Board.

The VTS will be implemented in stages. The first phase of New York Harbor's VTS will be implemented in August 1990, and will institute radar and closed-circuit television coverage for moving and stationary vessels in the Upper Bay, Kill van Kull and Newark Bay. The second phase, to be implemented in August 1991, will extend coverage to the Lower Bay, Raritan Bay, Ambrose Channel and the Arthur Kill. Coverage will only be extended to the Hudson and East Rivers in the final phase, to be implemented in August 1992.

The VTS should be implemented in August 1990 to cover at least the Hudson and the East Rivers, and the Arthur Kill/Kill van Kull. An examination of spills over the last ten years in New York Harbor led NRDC, in its report No Safe Harbor, to identify areas particularly hazardous for oil transport, due to tricky currents, rocky bottoms, heavy traffic, or narrow straits. These areas are the Hudson and East Rivers, known for rocky bottoms and tricky currents, the Kill van Kull and Newark Bay, due to rocky bottoms and the close maneuvering required, and the Arthur Kill, hazardous because of the large amounts of traffic and oil transfers that take place there. The most recent spill in the Kill, the July 19th collision of two barges which, according to news reports, caused 37,000 gallons of home heating oil to be spewed into the waters, is just one more illustration of the navigational dangers in the Kill van Kull/Arthur Kill areas.

In fact, numerous spills have occurred in the Arthur Kill and the Hudson and East Rivers. Thus, VTS coverage of these areas is vital to prevent future spills. The current plan to wait until August 1992 to extend VTS coverage to the Hudson and East Rivers, where five of the nine serious spills in the last three years have occurred, is completely unacceptable. Funding adequate to ensure all high risk areas in the harbor are covered should be allocated to the Coast Guard in New York by Congress.

A key change that has been proposed in the New York VTS is to make it mandatory for vessels to notify the Coast Guard of their presence and movements. In addition, it has been proposed that VTS personnel be allowed to control vessel movements during conditions of traffic congestion, reduced visibility or other hazardous circumstances. These proposals have not yet been finalized and are likely to face great opposition from the maritime industry. Both proposals would improve the effectiveness of the VTS in controlling navigation and preventing groundings and collisions.

Compliance with the VTS must be mandatory. Tankers and vessels should be required to report to the VTS monitoring station, the Vessel Traffic Center, on their location, depth in the water and proposed movements. The Vessel Traffic Center should have the ability to control movements of vessels when there is heavy traffic, bad weather and reduced visibility (including nighttime movements). It should also be able to control movements in narrow channels or where a vessel has had a history of navigational difficulties.

Thank you again for allowing NRDC to testify here before you today.

Mr. TORRICELLI. Thank you very much. Mr. Keith?

Mr. KEITH. Thank you Mr. Chairman. My name is Virgil Keith. I am the Chief Naval Architect and Managing Principal of ECO of Annapolis, Maryland. As a practicing naval architect with over twenty years experience in tanker design, tanker operations and tanker safety, I have had the pleasure of working with the State of Alaska on the Alaska Oil Spill Commission's report.

In that regard, I am here today to present the testimony of Mr. Walter Parker, Chairman of the Alaska Oil Spill Commission, who is unable to join us today from Anchorage. Mr. Parker asked me first to thank you Mr. Chairman, for allowing the views of the Alaska Oil Spill Commission in the State of Alaska to be presented, and requests your support in implementing their recommendations.

He also noted and asked me to point out that he noticed the work that you have done and Congressman Gallo with respect to tanker design and this very issue of vessel monitoring systems. He has been working on this project in Alaska for over twenty years and he said, you, Mr. Chairman and members of this Subcommittee, have done more in the last year than anyone else has in the last twenty years, so I compliment you for that sir.

Mr. TORRICELLI. Thank you very much.

Mr. KEITH. I am just going to read —

Mr. TORRICELLI. We haven't succeeded yet so don't be too complimentary.

Mr. KEITH. What did he say — he said "Before the Exxon Valdez, we were deep in the end zone and you and Congressman Gallo have carried the ball to the ten yard line", so we are almost there but we are not in the end zone yet.

Again, I will read just a couple of paragraphs from Mr. Parker.

Thank you Mr. Chairman for this opportunity to testify. I am Walter Parker, Chairman of the Alaska Oil Spill Commission who recently completed an intensive investigation into the wreck of the Exxon Valdez and the subsequent oil spill. In our five volume report of 1,322 pages, the Commission examined the entire oil transportation system from stem to stern.

As a result of our investigation, the Alaska Oil Spill Commission identified that the quickest and least expensive improvement that could be done to dramatically enhance marine safety was to substantially improve the ability to monitor marine traffic and to impose a greater degree of control over that traffic so it is two fold. First to monitor and second to control. I think what you have been saying since we first met, akin the Coast Guard has to become to our ports what the F.A.A. is to the airports. I think there couldn't be a better analogy."

The second part of Mr. Parker's testimony is, "Whether Loran-C or GPS is used, to require that system really makes little difference. The basic positioning input to that system can be changed as technology advances. The important thing is to get a system adapted now and underway of utilizing today's best available existing navigational system."

Mr. Parker points out that the State of Alaska with the Coast Guard and with ARCO on the ARCO FAIRBANKS, tested Loran-C retransmission system fourteen years ago in 1976. We found that to be very, very satisfactory, a very workable system. Everybody was on board; however, it was never implemented. That is part of Mr. Parker's frustration and that he compliments you for being able to bring that system on in a year and he hasn't been able to do that in fifteen years.

What is needed now is strong federal legislation. Most importantly we hope for the strongest possible action in four areas: first, tanker design including double hulls which again you Committee has spearheaded; second the vessel monitoring system including shipboard precise navigation displays, or the electronic displays that we talked about; next is crew training; and the fourth is an improve capability to recover spilled oil.

The Alaska Oil Spill Commission strongly recommends the introduction of vessel monitoring systems with shipboard navigational displays or what has been referred to up here as electronic chart display and information system, as rapidly as possible. This system is the most cost effective method to substantially upgrade port safety. If combined with the strong vessel monitoring system that the Coast Guard under the very able leadership of Admiral Kime, and we noticed a great turnaround in the Coast Guard under Admiral Kime's leadership and we note that he comes from a strong marine background and coupled with Captain McCarty, who has been at this for a number of years, we see the only thing lacking is the funding and perhaps you can take care of that Mr. Chairman, perhaps.

If combined with the strong system, it is estimated that the oil tanker accidents could be reduced by 50 percent. This was done on the real time simulator working with the Coast Guard. We think that is significant that we could have a 50 percent drop; however, we point out there is still going to be accidents so that response is very, very critical. Whether we use Loran-C or satellite navigation, there is no reason why tankers should not be tracked whether in our ports or off our coastlines. With controllers in the vessel traffic centers and the bridge looking at the same displays, in other words, they see the same electronic displays — the chances of error leading to either groundings or collision are dramatically reduced. The cost of this system for the entire nation is substantially less than the clean up costs of a major oil spill. In fact, the cost for the entire nation could be less than ten percent of the clean up costs for the Exxon Valdez alone.

With that, we have generated several oil spill graphics and I will just pick out two or three to show you, that will display and what we are saying, that can be built into the same software system so you can see the ship.

Mr. TORRICELLI. What are you going to display them on?

Mr. KEITH. Just on the view graph right here, sir.

Mr. TORRICELLI. That would be helpful for you but I won't be able to see it.

Mr. KEITH. How can we do that sir?

Mr. TORRICELLI. I don't think you can, we ran into this earlier. Unfortunately the room is not set up to accommodate it. This is the only screen.

Mr. KEITH. All right, well at the end of the testimony we have the graphics for several of the areas that show the Exxon Valdez oil spill in several different ports and we have modeled that for seventy-two hours, well for 24, 48 —

Mr. TORRICELLI. Do you have this printed on something Mr. Keith?

Mr. KEITH. They are printed in the hand outs, they are ready to go.

Mr. TORRICELLI. That's fine then as long as we can get to see them.

Mr. KEITH. And I think the important thing it shows that you are — the importance is: (1) is prevention, and (2) is the oil spill clean up.

Mr. TORRICELLI. Have you done this for the Port of New York too?

Mr. KEITH. We have for the Port of New York and also for your ports, at your request, down in the Delaware area. And you can see how rapidly that oil spreads within that twenty-four hour period. And what we are saying is that these types of ports, where we are looking at the actual weather conditions can be incorporated right into the vessel monitoring system so that when something happens, you can get the display to see where to locate your clean up equipment. And then with respect to the final point, with the improved capability to recover spilled oil, what we are suggesting Mr. Chairman is exactly what you are doing I think in Title 4 of the proposed oil spill liability legislation is that one limit the liability to the responders, to those people who have to get out and clean oil. We see that as essential. Alaska is now doing that now so if the fisherman or anyone from this area have to respond if they have a limited liability. Obviously there has to be one person in charge that should be the Coast Guard, we think. And the other thing is with respect to the duplication of equipment. We note that some states still on their books do not limit the liability for the responders. We see that as a real holdback.

Mr. TORRICELLI. Mr. Keith let me ask you about your visuals since we are not going to get to see that on the screen. The areas that you have of impact, if the same amount of oil were to go into the Port of New York and New Jersey, is this where there would be oil reaching the beaches or oil in a certain quantity — how are you defining the impacted area?

Mr. KEITH. That is where there would be oil on the surface. It shows the spread on the surface. There are two models so where we look at that under the actual wind and current conditions, so at the end of the time that is the part that would be oiled.

Mr. TORRICELLI. So this is water that would be impacted?

Mr. KEITH. Water would be impacted, as well as the shoreline that would be impacted.

Mr. TORRICELLI. So the shoreline then — your projections would range from Sandy Hook to Coney Island to the entire East River, the Hudson and halfway up Manhattan, the entire of New York Harbor and Staten Island all the way to the Arthur Kill.

Mr. KEITH. That is correct sir, and the important thing is it recognizes right on the top that it is the same size of the Exxon Valdez, that is an 11 million gallon spill of crude. In this case we did not use Alaskan crude but we used the Venezuelan crude and the accident occurred at the Verranzano Bridge, right at the narrows, and we had it released in five hours.

Mr. TORRICELLI. So, in fact, it would not have original — simply original impact but would uncover the entire harbor?

Mr. KEITH. Absolutely sir.

Mr. TORRICELLI. That is a very good thing for people to know that, it is now clear as many of us believe this is simply an accident waiting to happen and that this will not be a problem for the Arthur Kill or a difficulty for Sandy Hook. We are going to lose this entire harbor and it would impact for years with an accident of that magnitude.

Mr. KEITH. It will sir and somebody mentioned to me well you are not going to have an Exxon Valdez size ship in New York Harbor—that is correct. But, what you pointed out in your press release, we typically have ships carrying crude of 25 million gallons into the harbor right now, so what we are saying is we are going to have a ship and it is going to lose half of its cargo at 11 million gallons and these—

Mr. TORRICELLI. Well, Mr. Keith, we have been talking about a collision of two of them.

Mr. KEITH. That is another thing sir.

Mr. TORRICELLI. Which is, given the amount of traffic that is coming into this harbor, is not an impossible, over a period of years even unlikely event.

Mr. KEITH. Yes, sir.

Mr. TORRICELLI. Do you have anything further Mr. Keith?

Mr. KEITH. I don't. I would just again like to say, on behalf of the Alaska Oil Spill Commission, thank you Mr. Chairman, members of your Subcommittee for holding this hearing and giving us the opportunity to convey our recommendation. Again we remind you, the ball is at the ten yard line, we have lateralled it back to you, and you have to carry it in sir.

[The prepared statement of Mr. Keith follows:]

TESTIMONY OF VIRGIL F. KEITH
PRESIDENT, ECO, INC.
1036 CAPE ST. CLAIRE CENTER
ANNAPOLIS, MD 21401
(301) 757-3245

BEFORE THE HOUSE SUBCOMMITTEE ON TRANSPORTATION, AVIATION AND MATERIALS
OF THE COMMITTEE ON SCIENCE, SPACE AND TECHNOLOGY

GIVEN AT NEW YORK, NY
July 30, 1990

Mister Chairman, Members of the Subcommittee, and Ladies and Gentlemen. My name is Virgil Keith and I am the Chief Naval Architect and Managing Principal of ECO, Inc. of Annapolis, MD. As a practicing naval architect with over twenty years experience in tanker design, tanker operations and tanker safety, I have had the pleasure of working with the State of Alaska on various aspects of their marine transportation system for the past 15 years.

In that regard I am here to present the testimony of Mr. Walter Parker, Chairman of the Alaska Oil Spill Commission (AOSC), in Anchorage, Alaska, and who is unable to join us today. Mr. Parker asked me to thank you for allowing the views of the Alaska Oil Spill Commission to be presented, and requests your support in implementing their recommendations.

I might add that from the viewpoint of a naval architect with twenty years experience in tanker design and port operations, the AOSC report is the most comprehensive, most factual, and most executable analysis which has ever been integrated into this Nation's marine transportation system. This report was submitted to the Congress on May 24, 1990. The AOSC made 59 recommendations for improving the safety of marine transportation of oil and oil products and for improving response capabilities and technologies used in oil spills. The Alaska Legislature enacted into law 35 out of 37 recommendations which required action at the state legislative level.

What we now need to implement is strong federal legislation. Most importantly we hope for the strongest possible action in four areas: tanker design including double hulls; vessel monitoring systems including shipboard precise navigation displays; crew training; and an improved capability to recover spilled oil.

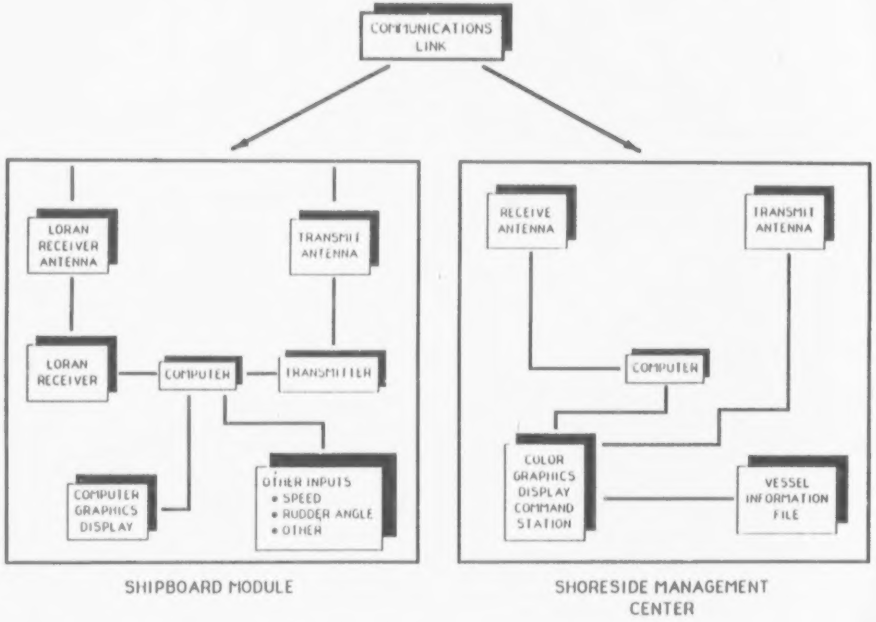
The Commission has studied the double hull issue in depth and believes that the record of the past 20 years indicates that double hulls would have prevented oil spills in most cases and would have severely limited catastrophic spills. The AOSC's risk analysis shows a dramatic dramatic increase in spill limitation when double hulls are introduced. No other single factor in tanker design has such a major impact with respect to reducing oil spills.

The Commission strongly recommends the introduction of vessel monitoring systems with shipboard navigation displays as rapidly as possible. This system is the most cost effective method to substantially upgrade port safety. If combined with a strong vessel monitoring presence by the Coast Guard that establishes tanker lanes where they do not now exist and where tanker are required to stay in those lanes except for departures due to declared emergencies, it has been estimated that oil tanker accidents could be reduced by over fifty percent! Using either Loran C retransmission or satellite navigation, there is no longer any reason why tankers should not be tracked whether in our ports or off our coastlines. With the controllers in the vessel traffic centers and the bridge watch looking at the same display, the chances of error leading to either a grounding or collision are dramatically reduced. The cost of this system for the entire nation is substantially less than the clean up costs of a single major spill.

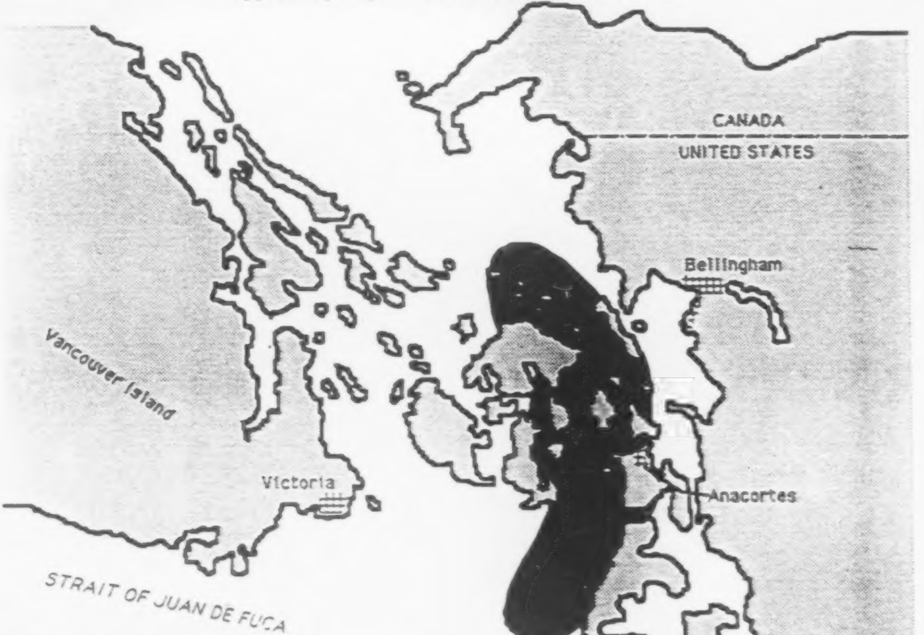
Attached with this statement are seven graphics generated by ECO's computerized oil spill model. As requested during our previous testimony before this subcommittee, we have simulated the EXXON VALDEZ spill (11 million gallons) in the following areas within the lower 48 states: Seattle, Long Beach, New Orleans, Chesapeake Bay, Delaware Bay, and New York. These simulations are constructed using detailed local weather data including wind speed and direction, tidal and non-tidal current speed and direction, air temperature, oil composition, as well as other variables. The graphical results of the simulations clearly show the importance of prevention measures including a vessel monitoring system, as well as the importance of improved cleanup capabilities.

On behalf of the Alaska Oil Spill Commission I would like to thank you, Mr. Chairman, and Subcommittee members for holding this hearing and giving us an opportunity to convey the most important of our recommendations.

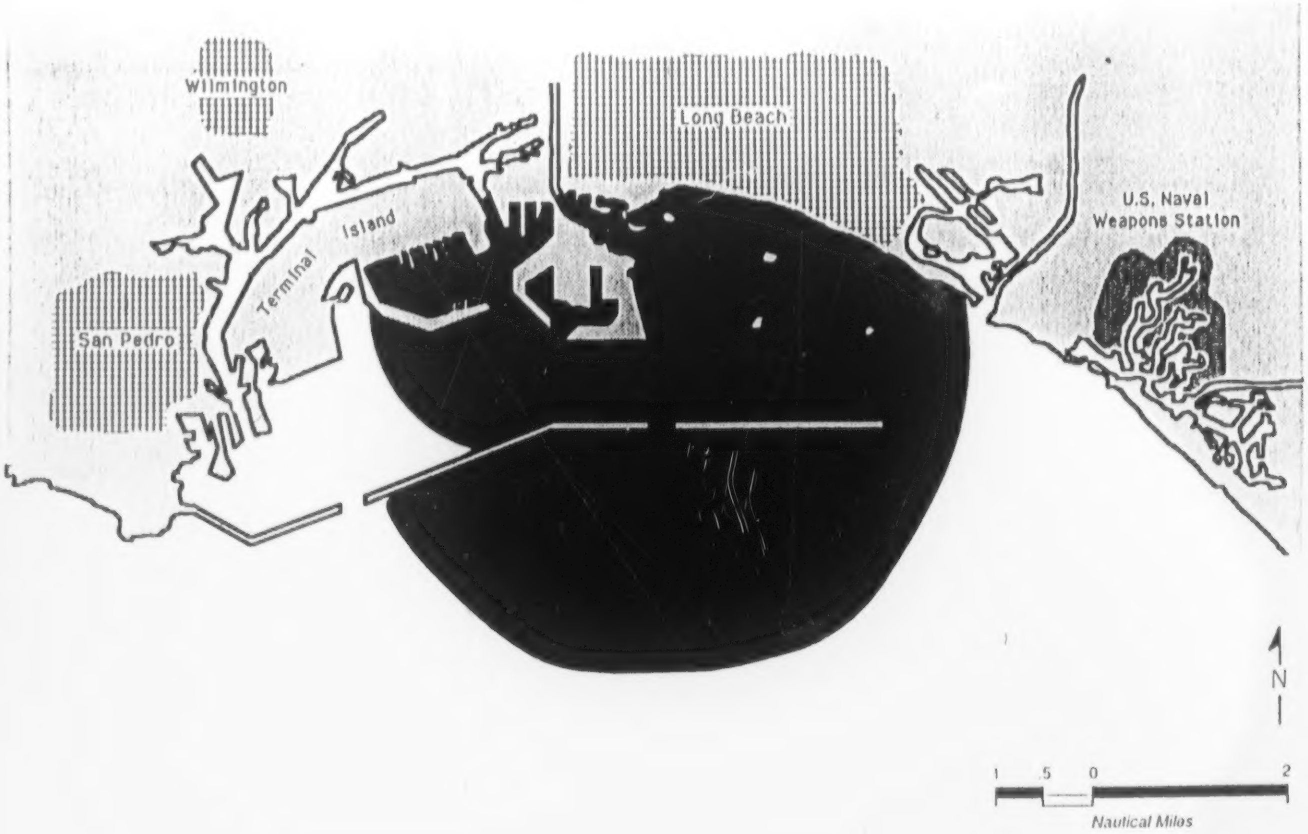
VESSEL MONITORING SYSTEM


COMMUNICATIONS LINK
LORAN RECEIVER ANTENNA
TRANSMIT ANTENNA
LORAN RECEIVER
COMPUTER
TRANSMITTER
COMPUTER GRAPHICS DISPLAY
OTHER INPUTS
• SPEED
• RUDDER ANGLE
• OTHER
SHIPBOARD MODULE
RECEIVE ANTENNA
TRANSMIT ANTENNA
COMPUTER
COLOR GRAPHICS DISPLAY COMMAND STATION
VESSEL INFORMATION FILE
SHORESIDE MANAGEMENT CENTER

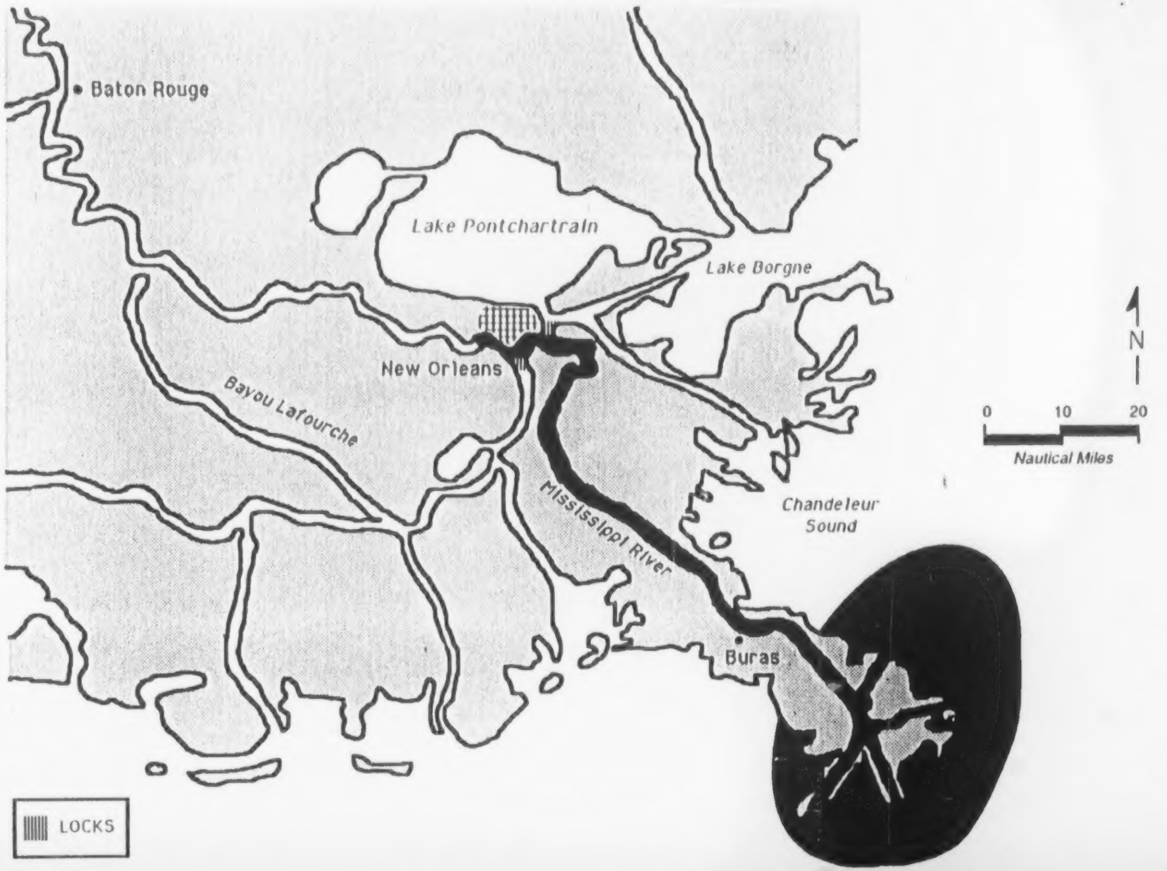
Rosario Strait - 72 Hours After Spill
Spill Size = 11,000,000 Gallons Of Alaskan North Slope Crude, Spilled At Rosario Strait
Typical Spring Wind And Current Conditions


CANADA
UNITED STATES
Bellingham
Vancouver Island
Victoria
Anacortes
STRAIT OF JUAN DE FUCA
Everett
WASHINGTON
Seattle
N
0
10
20
Nautical Miles

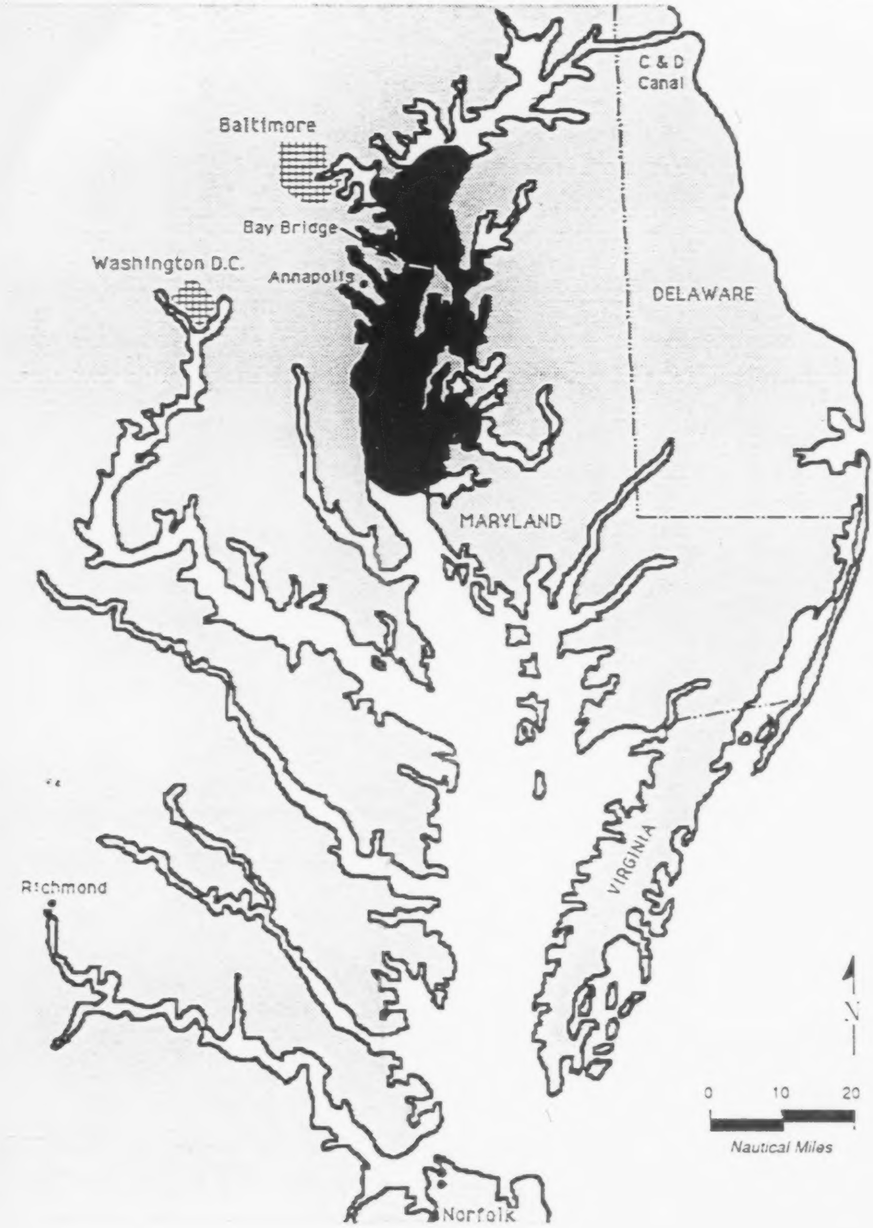
Long Beach - 24 Hours After Spill
Spill Size = 11,000,000 Gallons Of Alaskan North Slope Crude, Spilled At Long Beach Light
Typical Spring Wind And Current Conditions


Wilmington
San Pedro
Terminal Island
Long Beach
U.S. Naval Weapons Station
N
1 .5 0 2
Nautical Miles

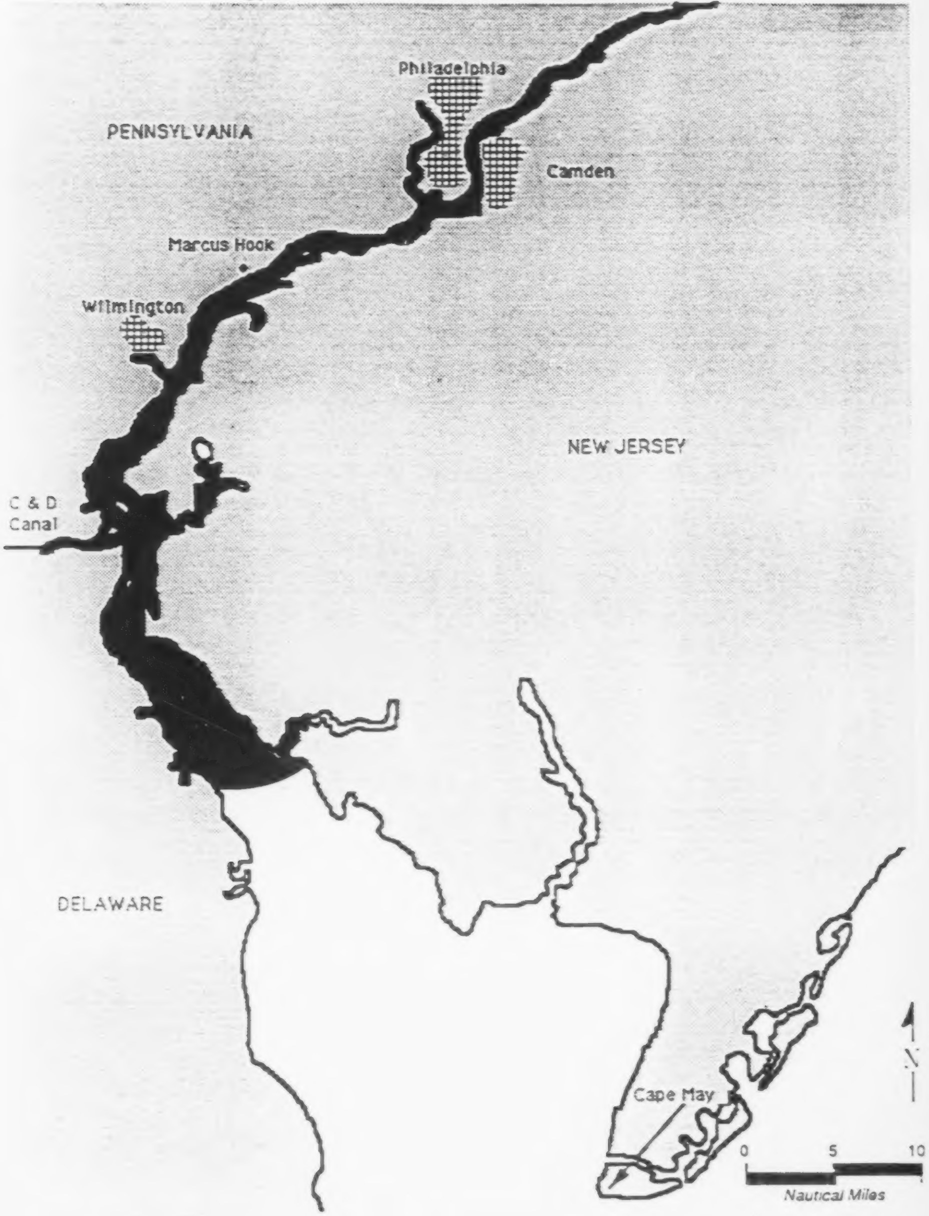
New Orleans - 48 Hours After Spill
Spill Size = 11,000,000 Gallons At Huey P. Long Bridge
Typical Winter Wind And Current Conditions


Baton Rouge
Lake Pontchartrain
Lake Borgne
New Orleans
Bayou Lafourche
Mississippi River
Chandeleur Sound
Buras
N
0
10
20
Nautical Miles
LOCKS

Chesapeake Bay - 168 Hours After Spill
Spill Size = 1,000,000 Gallons Of Fuel Oil At Annapolis Anchorage
Typical Winter Wind And Current Conditions


C & D Canal
Baltimore
Bay Bridge
Washington D.C.
Annapolis
DELAWARE
MARYLAND
VIRGINIA
Richmond
Norfolk
N
0
10
20
Nautical Miles

Delaware Bay - 72 Hours After Spill
Spill Size = 11,000,000 Gallons At Marcus Hook
Typical Winter Wind And Current Conditions


Philadelphia
PENNSYLVANIA
Camden
Marcus Hook
Wilmington
NEW JERSEY
C & D Canal
DELAWARE
Cape May
N
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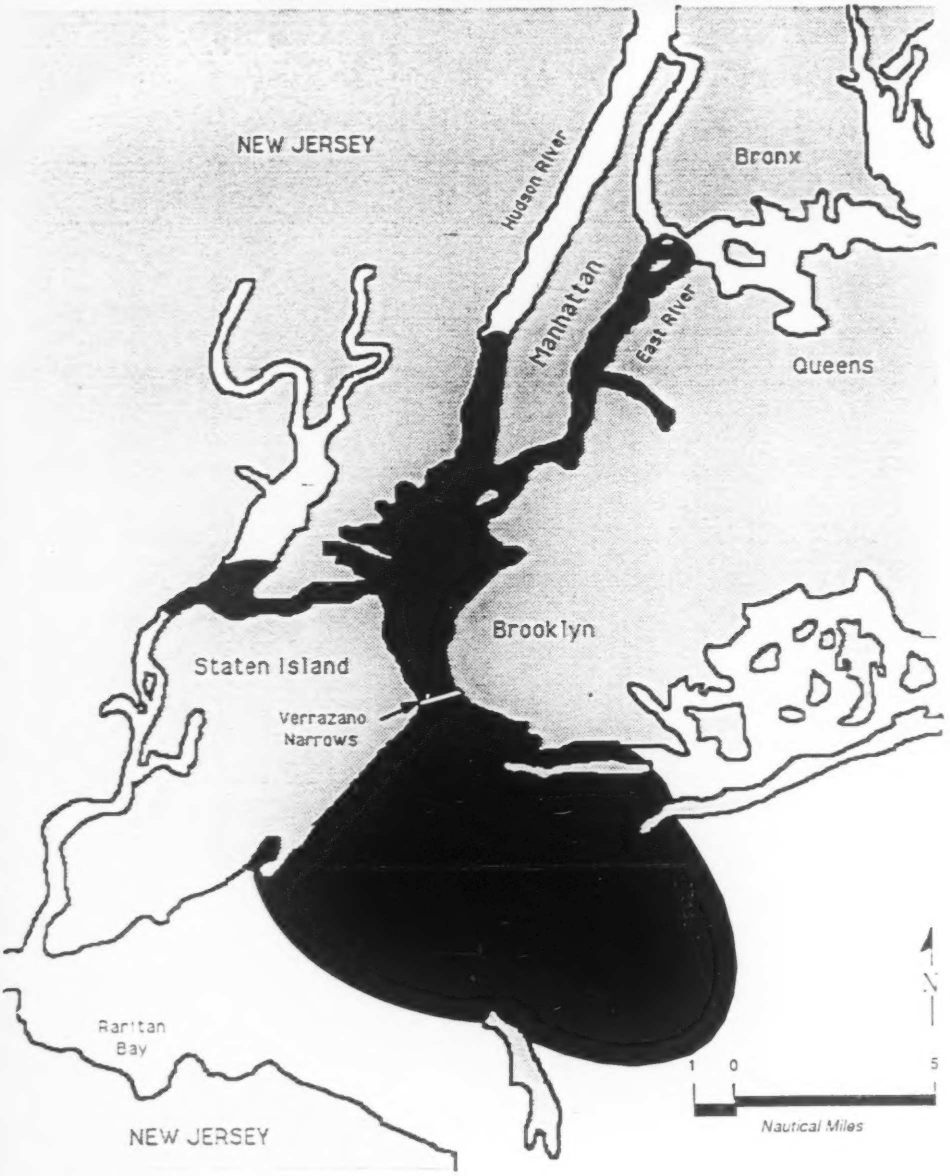
5
10
Nautical Miles



New York - 24 Hours After Spill
Spill Size = 11,000,000 Gallons At Verrazano Narrows
Typical Winter Wind And Current Conditions

NEW JERSEY
Hudson River
Bronx
Manhattan
East River
Queens
Brooklyn
Staten Island
Verrazano Narrows
Raritan Bay
NEW JERSEY
N
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0
5
Nautical Miles

THE ENVIRONMENT

Spills fail to hasten tanker changes

EDITOR'S NOTE: After $30 million of repairs, the *Exxon Valdez* is due back at sea in August with a new crew, new steel in its shredded hull, new ports of call in the Middle East and a new name — *Exxon Mediterranean*. But no such industrywide makeover has occurred to limit oil spills and their damage.

> "This industry is in a bad way. We have to make drastic hcanges in the way we build, operate and license in this business. Who's studying the whole picture? Nobody."
>
> *— Former Exxon executive*

By ROBERT DVORCHAK
AP National Writer

NEW YORK — It seemed like a maritime version of Murphy's law.

The wayward *Exxon Valdez* plowed into Bligh Reef. Then three shipwrecks oiled three waterways within 12 hours last June.

The *American Trader* ran over its anchor and gashed itself. The *BT Nautilus* was one of three spills in three months in the New York City area. The *Mega Borg* caught fire in the Gulf of Mexico. And on and on and on.

But these accidents, all within 15 months of each other, are more than just a run of bad luck. Systemwide flaws in the way tankers are built, operated and monitored contribute to accidents, according to records and interviews with industry experts.

On an average of five days out of seven last year, a tanker ran aground, hit another ship or a dock, broke apart, sprung a leak, exploded or had some other kind of mishap, according to Coast Guard records.

A Coast Guard report on tanker safety cited "formidable problems" in regulating tankers. Among them are fatigued tanker crews, shipowners who give more priority to schedules than safety and inspectors who are overworked and burned out.

The Center for Marine Conservation has called for a presidential task force to assess tanker safety because no agency is doing a top-to-bottom review. It also criticized cutbacks in the Coast Guard as "false economizing."

And despite the *Exxon Valdez* wreck that caused the nation's worst oil spill on March 24, 1989, the industry remains ill prepared to handle a major spill and a glacial-paced Congress still hasn't passed a tanker safety package.

The result is bleak news for a nation whose gluttonous appetite for oil means more tankers, many of them aging, will be pulling into its ports. On any given day, about 50 tankers carrying 450 million gallons of oil sail into U.S. harbors, each one a potential environmental disaster.

"We are asking for trouble," said Clifton Curtis, president of the Oceanic Society.

And not just environmentalists are uneasy.

"This industry is in a bad way," said Arthur MacKenzie, head of the Tanker Advisory Group and a former Exxon Corp. shipping executive. "We have to make drastic changes in the way we build, operate and license in this business.

"Who's studying the whole picture? Nobody."

In sheer numbers, the Coast Guard investigated 265 oil spills from tankers last year, an average of five a week. Most were minor, but six were more than 10,000 gallons, including the 11 million gallons disgorged by the *Exxon Valdez*.

Add last year's 639 tank barge incidents, and the average is 17 a week.

A private study by Golob's Oil Pollution Bulletin in Cambridge, Mass., counted 78 spills of 10,000 gallons or more in the past 12 years, an average of nearly seven a year.

Total spillage was 41 million gallons. At the same time, 243 billion gallons, or 99.98 percent of the oil shipped, got to shore safely.

The oil industry says that record hardly supports the image of an oceanic demolition derby. But six major spills have occurred already this year. And the public, as much as it demands the oil, won't tolerate the sliming of beaches and shorelines.

"What was an acceptable level of performance 10 years ago is not acceptable today," said Sean Connaughton of the American Petroleum Institute. "There's an almost zero tolerance for oil spills. The sensitivity is so much greater now."

Environmentalists say the breakdowns are not isolated incidents but examples of common problems, the way Three Mile Island was in the nuclear power industry and the *Challenger* explosion was in the space industry.

"Clearly, this is an issue that has reached and will exceed crisis proportions. The potential for an increasing number and more severe accidents is very high," said Roger McManus, president of the Center for Marine Conservation.

"What we have on the seas is something we wouldn't put up with in air traffic," he said. "It desperately needs attention."

Turning things around is trickier than steering a supertanker in a tight channel. There is no one solution because there is no one problem, and no one agency who can fix it.

Each branch of Congress passed its own version of an oil tanker safety bill last fall. But a 100-member conference named to reconcile the differences had met just once before the *Mega Borg* exploded June 9 and leaked 3.9 million gallons of oil.

On July 12, the committee reached a compromise that would require new tankers be built with puncture-resistant double hulls while existing tankers be fitted with a second hull or phased out of service over the next 20 years.

In addition, the bill would create a $1 billion oil spill response fund, make it easier for the Coast Guard to take over cleanup efforts, set liability levels for spills and toughen licensing requirements for tanker crew members.

A final vote is pending.

Meanwhile, the Coast Guard motto is "Semper Paratus" or "Always Prepared." But in an interview, its commandant said the service would be better suited to live up to its motto if Congress acts.

"There is more that can be done. We're less prepared without this bill," conceded Adm. J. William Kime. "We need to do everything we can to minimize the probability we're going to have a spill and then maximize our ability to limit the impact of the pollution."

The Coast Guard, in a 44-page report by its Tanker Safety Study Group, said a review of tanker operations has not been done in 10 years.

Among the highlights of the report, distributed last fall to all admirals, were:

Tankers are being driven harder and faster by shipowners more concerned with schedules than safety; the Coast Guard pays too much attention to owners' desires to make money and too little attention to safety; Coast Guard inspectors are overworked and burned out by a "dirty and tiring job," and their training is inadequate; tankers are built with 18 percent less steel than in the 1970s; newer ships are so big only 20 percent of the inside of their cargo tanks are inspected.

The report said the best way to avoid shipwrecks is having competent crews, because human error plays a part in 90 percent of the groundings and collisions and 75 percent of the fires and explosions.

Cuts in the number of crew have "severely impaired" routine maintenance, the report said. And relying on automation and machines as a cure-all "misses the point and provides a false sense of security."

Fatigue is also factor. When Coast Guard inspectors met with chief mates to set up inspections, "some mates were so exhausted they fell asleep during these meetings."

The Center for Marine Conservation did its own study called "Shipping Safety and America's Coasts." It urged presidential action and assailed Congress for not giving the Coast Guard the money and manpower to do its job right.

"Our coasts deserve a better defense than they are getting from false economizing," said the center's Michael Weber.

The center said better radar used in other parts of the world could be used in domestic ports for less than the cost of a cleaning up a good-sized spill. Exxon has spent $2 billion on the *Valdez* cleanup.

AP photo

An oil spill is seen behind the tanker *American Trader* off the coast of Huntington Beach, Calif., earlier this year. On any given day, about 50 tankers carrying 450 million gallons of oil sail into U.S. harbors, each one a potential environmental disaster.

In Valdez, the Coast Guard cut the power on its radar and reduced crew sizes for budget reasons. The *Exxon Valdez* was off the screen when it crashed. Foreign ports have radar that beeps an alarm if a ship strays from its channel. In another cost-cutting move, the Coast Guard cut out vessel traffic systems in New York and New Orleans. The system, used in five ocean ports, allows mariners to see beyond blind corners and keep up to date on what other ships are doing. But other countries have better systems.

At Sullom Voe, Europe's largest oil and gas terminal operated by British Petroleum Co. in Scotland's Shetland Islands, licensed pilots instead of technicians work at radar screens to steer tankers past reefs and hazards.

"The existing vessel traffic services in the U.S. are far from state of the art," said Richard Townsend, who did the study for the Center for Marine Conservation. "Much better systems currently are available, using off the shelf technology that is vastly superior to that currently used by the Coast Guard."

In the private sector, 20 oil companies formed the Petroleum Industry Response Organization last year. The group would set up five regional centers covering 24 coastal states that would act as gigantic fire houses with booms, skimmers and oil dispersants.

But the organization is waiting for Congress before it buys any equipment.

"The void that existed when the *Exxon Valdez* had its accident still exists as far as cleanup is concerned," said retired Adm. John Costello, who heads the group. "We don't own any ships or any booms yet."

Mr. **Torricelli**. Thank you Mr. Keith, and these charts will be of interesting reading to my colleagues. We will distribute them and thank you for providing them. Dr. Guest?

Dr. **Guest**. Thank you very much. I am very happy to be here to talk about the VTS and the use of high technology for monitoring the passage of ships.

Just by way of introduction, Marine Safety International, I am the Director of Marine Safety International. We have been in the business of doing simulation research and training for maritime realms since 1974. We are the wholly owned subsidiary of Flight Safety International, Premier Simulator Training Facility, headquartered in Congressman Scheuer's district at La Guardia Airport. One of our premier centers is in your district here in New Jersey at Teeterboro Airport and, of course, we have two simulator facilities out in Long Beach, California where Congressman Rohrabacher hails from.

Marine Safety International 1987 took over operation of the computer aided operations research facility which has been alluded to here in the hearing so far this morning. We took over as a cooperative agreement with the maritime administration and have been conducting research into the maritime realm since that time.

I would like to make just a brief comment on the VTS in New York. Three things I want to point out, all balled up into the same item and that is that recent large numbers of accidents in maritime transportation we think are due to an apparent lack of proficiency, proficiency meaning a demonstrated ability to do the job required. When we approach vessel traffic service, one thing we have to be careful about, whether in New York or wherever, and that is that the addition of risk reducing measure like VTS needs to be examined to show that its various components raise the proficiency level of the equipment, the personnel and the procedures, rather than lower that proficiency level, and we feel that there is need for some on line simulation research to investigate that problem of the implementation of vessel traffic service systems in New York or anywhere in the United States. Of course, it has been mentioned by Mr. Birgeles of the Port of New York, the Port of New York, New Jersey and the Coast Guard, the New York Coast Guard have been very forward looking in using marine simulation services to examine, for instance, the CAORF construction of the Kill Van Kull waterway. CAORF has engaged in a three phased study of that waterway where it is going to be restricted during its construction. There is a federal project to deepen the waterway to allow deeper tankers to come into the Port of New York/New Jersey.

They have looked at that and they are continuing to look at it and I dare say that is one of the impetus for creation, resurrection of the vessel traffic service in New York because ships of certain size and description, the ships are going to have to be controlled as far as when they are going to move and as far as the tidal, the state of the tide, and the state of the wind and the size of the ships. All that is going to be considered when it goes to deepening the Kill Van Kull waterway. The problem is, of course, that in order to deepen it, they have to blast, that means they have to restrict the waterway, narrow it down, and that is going to cause mitigation.

There will have to be some mitigation measures developed to allow for the continued traffic and continued commerce in that waterway while they are going through that construction.

Now, as far as VTS goes, there is a need to look at, as I said, the proficiency of VTS and in three areas: procedures, equipment and the personnel. In 1979, we conducted a simulation study of the VTS in New York Harbor. Procedures were used that are similar to the ones that were used in the system that was terminated in 1988. I would like to read from that study, conclusions of that study, two short verbatim quotations.

First, and I quote, "The effect of VTS imposed radio procedures are shown to further increase an already heavily used medium, that is, VHF radio. It will be necessary to examine further the relationship of radio communications with pilot workload and performance under extreme conditions." That, of course, has not been done in conditions of reduced visibility. The further quote, "The vessel traffic service at that point did not appear to be of any significant benefit to the pilot, the person who is handling the ship. Although the scenario encompassed an area reported by the Coast Guard studies to hold some of the highest traffic levels in the port", that is, from one mile south of Norton Point to one mile west of Shooter's Island, that is where the majority of the traffic goes.

The point that I am making there is that the VTS radio procedures were not helpful and increased the workload of the bridge team handling the ships. There is a need to look at the procedures. What we have heard on the middle panel this morning was that we have great technology to gather the data, but the important part of vessel traffic service is that the data is analyzed and decisions are made to keep the vessels safe. Not just gathering the data but analyzing that data. That is where the human element comes in and that is what is unknown, how that human element is going to be able to control that shipping.

Mr. TORRICELLI. Is there an element of too much data being provided, similar to air traffic control problems?

Dr. GUEST. Yes, yes. We trained officers of tanker companies going to Valdez, Alaska. There has been a great increase in the use of vessel traffic service in Valdez, Alaska, Prince William Sound and the traffic on the radio has gone up to a level where it is counter productive. All of the tanker masters and officers that come for training have said that the amount of radio traffic is disturbing, it is counter productive, it takes their attention away from the job that they are doing and there are so many things that are going across the airwaves that are incidental to the job of keeping the vessel safe.

Mr. TORRICELLI. I can see that, just from listening to maritime traffic. There is a real balance to be struck here. That is true with the amount of communications taking place and it is also true any time data is placed on the screen. This has been, of course, the Air Force's experience as well with their own planes. They give so much data to the pilots, people can't absorb the data.

Dr. GUEST. My next point is that, (1) the procedures need to be investigated, they really haven't been looked at carefully. One way of handling that would be to incorporate an advanced capabilities vessel traffic service system, ACVTS, advanced capabilities. This was examined in 1980, in a preliminary study, a preliminary simulation study which would use an — an ACVTS would use automatic responder/transponders on the ship to give to the VTS center automatic information about the position of the ship and it would also go back to the pilot who boards that ship. Let's say a pilot boards out in Ambrose Channel and bring him into New York. He would have a small handheld CRT which by a Loran or GPS would show him all of the vessels moving in the harbor, their location, their speed and direction. A 1980 simulation study proposed further study into this technology and that wasn't completed.

There must be new technology since 1980 and there is, we have heard about it this morning. There is a need to evaluate that new technology and compare it with existing VTS systems, like the one in Rotterdam, and to do it on line, that is, where people can actually go through the process of doing the job they have to do on the ship or on the shore using that new kind of equipment.

So, we have looked at then the procedures, the equipment — the most important thing I think that needs to be looked at is the watch officer or the operator of the VTS. Proficient VTS must have an expertly trained operator. There is no study or research that I know of that determines a VTS operator's qualifications, method of training or how that operator should be tested to demonstrate his proficiency.

A United States Merchant Marine, you can gain a certificate to operate the largest ship carrying the most hazardous cargoes without ever demonstrating that you can do the job of piloting that ship. You have to demonstrate that you have had experience, you have to take a paper and pencil examination, but nowhere do you get a road test. You don't show proficiency the way an aircraft pilot has to show proficiency every six months in flying his aircraft, the way a truck driver has to show proficiency demonstrated to an examiner. You don't have to do that. I would venture to say that is the same for a VTS operator. If most of our accidents are due to human error, 90 percent, and a VTS system is operated by a human being, there has to be some knowledge as to what are the qualifications and the training and the proficiency levels of the human beings disseminating that information and helping to control those ships, especially if the system becomes mandatory and if you take some of the decision making responsibility away from the master pilot and put it on the VTS operator.

Just as an anecdote, I was talking to a Canadian master who was in for training — a Canadian pilot and he was in a VTS operated area, he was told by the VTS operator he had anchored his ship one hundred yards too far to the west and he had to move his ship. He didn't move his ship, he got off the ship and went in to talk to the operator. He wasn't sure that the operator really knew what he was talking about and he asked the operator several things — how long was my ship, the operator didn't know. He said, what was the depth of the water at the state of the tide when I anchored my ship and the operator didn't know. He finally got frustrated and said well how many feet are there is a shot of chain, and the operator didn't know. Further frustrating him he said well how many feet are there in a fathom, a rather ridiculous question, of course, but the operator didn't know. The operator was very good at observing the radar and using the VHF telephone, but he didn't have the requisite skills beyond that to show himself proficient in order to keep that ship out of trouble, so in using VTS, I would say we need some on-line simulation based research into operator's qualifications and training in dynamic situations.

In Europe and in Rotterdam, they do this quite well. The Maritime Institute in the Netherlands, they have simulators to train their VTS operators. VTS operators are qualified pilots of the port and they looked into that extensively. In this country, I think we are second class when it comes to maritime events.

[The prepared statement of Dr. Guest follows:]

Statement Prepared By

MarineSafety International
Computer Aided Operations Research Facility (CAORF)
National Maritime Research Center
Kings Point, New York

Presented Before

U.S House of Representatives
Subcommittee On Transportation,
Aviation, and Materials
Committee on Science, Space and Technology

Presented By

F. Eugene Guest, Ph.D.
Director, MarineSafety International

New York, NY
Field Hearing
July 30, 1990

INTRODUCTION

MarineSafety International (MSI) is pleased to appear before this Subcommittee to provide expert opinion and make recommendations concerning the issue of a Vessel Traffic Control System for New York Harbor. MSI's area of expertise is in the application of shiphandling simulation technology in vessel operations research and in the training of ships officers and pilots.

MSI is a wholly owned subsidiary of FlightSafety International, the premier simulator training organization in the aviation industry. MSI was founded in 1974 at the suggestion of FlightSafety clients who wanted the same approach applied to training their ship captains and deck officers. In 1987 MarineSafety assumed operations and management of the Computer Aided Operations Research Facility (CAORF), a facility designed for the express purpose of conducting simulator based marine research. MSI operates CAORF under a cooperative agreement with the Maritime Administration. In addition to CAORF, MarineSafety operates four shiphandling simulators in Newport Rhode Island dedicated to both U.S. Navy and commercial training and operates engine room, radar and cargo-handling training simulators at LaGuardia Airport in New York and the SUNY Maritime College at Fort Schuyler, New York.

FlightSafety International is proud to operate flight simulators that I'm sure are familiar to the Members present. Our Teteboro Learning Center is in the New Jersey district of this Subcommittee's Chair, two Centers are in Long Beach, California where Congressman

Rohrabacher hails from and our Corporate headquarters for FlightSafety and Marine Safety are in Congressman Scheuer's district along with our CAORF facility.

I also had the pleasure of testifying before this panel earlier this year under the Chairman ship of Congressman Tim Valentine, in Long Beach, where we discussed ways to keep our harbors efficient and competitive. I'm delighted that this panel has taken such a strong interest in our nation's waterways. We at MSI have always believed that we should use the full resources of technology to ensure safe and efficient movement of ships.

Today, I am accompanied by Carmine Pizzariello, our Research Manager who helped to prepare for this hearing. I hope the Members will allow he, and I to answer any inquiries you might have after my presentation.

SIMULATION

MSI's primary research and training tool is high fidelity, real-time. "man-in the-loop" simulation, i.e. practicing mariners, pilots, etc. conn the simulated vessels. Virtually any vessel, any geographical area and all the important variables that impact on shiphandling. collision avoidance and navigation can be simulated to a very high degree of accuracy and realism.

MSI provides simulation services to government agencies and the maritime industry. In the area of operations research, the primary applications are in the area of port and waterway design, risk analysis and accident investigation. In the training area, MSI provides customized training programs for vessel and tug operators in the area of shiphandling, emergency shiphandling, Bridge Resource Management, harbor and/or vessel familiarization and apprentice mariner training.

MSI is testifying before this panel because we know through experience that simulation provides a powerful tool for identifying, studying and mitigating risk in the marine transportation system. The advantage of man-in-the-loop simulation is that all of the important components of the system are modeled and can be systematically altered; to objectively test how each change in the system may contribute to or inhibit safety; or, used to drill and hone the skills of apprentice or senior mariners; or, determine the proficiency of individual mariners by having them perform the tasks for which they are certified. These components would include: the environment (e.g., wind, visibility, currents), the waterway (e.g., channel width, turn geometry, water depth); the information system available to the mariner (e.g., aids to navigation, VTS), the vessel (size, displacement, handling characteristics) and operational procedures (e.g., level of tug support, shiphandling strategy, emergency response procedures).

THE PORT OF NEW YORK

MSI has recently completed a safety study of the Houston Ship Channel for the Port of Houston and performed the analysis of the track of the Exxon Valdez for the National

Transportation Safety Board. Closer to home, and to our agenda, is that MSI is presently under contract with the Port Authority of New York and New Jersey to evaluate the safety of alternative plans for the ongoing phased excavation of the Bergen Point area in Kill Van Kull. This simulation study is a cooperative effort between the Port, the New York District of the Army Corps of Engineers and the Office of the Captain of the Port of New York. The simulation model being used was originally built for the N.Y. District to conduct an engineering design analysis of the entire Federal Project.

The present simulation study was initiated because of safety concerns over the channel width restrictions that are necessary during the phased excavation of the Bergen Point area. The Office of the Captain of the Port has played an active and aggressive role in this study.

Two alternative excavation schemes have been tested to date. A third phase of simulator testing is being planned now. The continuing problem is one of maintaining safe operations over an economically viable window of tidal current. Indications are that some restriction in traffic, with regard to size, direction of transit and environmental window, will need to be imposed. A VTS could provide a mechanism for monitoring and even for imposing such restrictions.

MSI's position is that a properly designed VTS will contribute to safety. However, the issue of VTS design is a complex one and a poorly designed system would at best be a waste of taxpayer money and at worse, may be detrimental to waterway safety. In 1979

CAORF performed a simulation analysis of a VTS in New York Harbor and the study findings send a mixed signal. The VTS procedures tested during the study were precursors to those used in the system taken off line in 1988. The study findings indicated that the VTS system increased pilot/mariner workload with no measurable improvement in waterway safety. The study went on to warn that under extreme conditions of pilot workload, the VTS might even be detrimental to waterway safety. The design of the VTS system not only involves the equipment and technology used to monitor and/or control vessel movement. Factors such as the procedures, level of control assumed by the system, user acceptance and trust, operator training and the workload imposed on bridge personnel by the system are all aspects of the systems design. Short comings in any one of these areas could lead to increase in risk on the waterway.

MSI routinely trains and exchanges ideas with hundreds of professional mariners every year. There is much anecdotal information to suggest that many of the current VTS systems that are already in place could use some improvement. Poor operator training is very often cited as a problem. The issue of an "advisory" as opposed to a "control" system must also be addressed.

RECOMMENDATIONS

The 1979 simulation study of the New York VTS is an example of risk mitigation using simulation at its best. MSI has a large portion of the Kill Van Kull and Arthur Kill modeled to a very high level of fidelity. A good portion of the rest of New York Harbor is also modeled to lower and varying levels of fidelity. Ships of the type and size and even the same class as those calling in New York are modeled. All of these represent a resource that should be used to assist in configuring the new VTS service for New York Harbor.

MSI is cognizant of the need for field evaluation of existing systems and discussion with the system future users however, a VTS is always harbor specific and only experience and time can root out all problems in the system. Simulation affords the opportunity to examine the major system components in an operational mode before capital investment or premature commitment to improper procedures. Some of the more obvious applications for simulation in establishing a VTS for New York Harbor (or any harbor) are summarized below.

* Evaluating new technology VTS systems

* Alternate existing VTS systems

Procedural Assessment and Design

Vessel advisory vs. vessel control

- Site/channel specific tuning of procedures

- Voice Communications - workload, potential for misunderstanding, protocol

- Identification and elimination of potential systems induced errors/accidents

Operator Training

- Determination of operator qualifications

- Training for proficiency

- Demonstration of proficiency by doing

Thank you for this opportunity. I will be pleased to answer any questions you might have.

Mr. **Torricelli**. Are you ready for questions Dr. Guest?

Dr. **Guest**. Yes.

Mr. **Torricelli**. The major oil companies and oil transport companies, to what degree are they individually requiring their captains to engage in regular simulation training dealing with various emergency scenarios?

Dr. **Guest**. I know the ones that we have dealt with and are training at this particular time and that includes —

Mr. **Torricelli**. Which of the majors are those?

Dr. **Guest**. Exxon, Mobile, Chevron, Ameretta Hess, Maritime Overseas Corporation.

Mr. **Torricelli**. And do they have this as a regular mandatory requirement?

Dr. **Guest**. It is an internal requirement by their management that their tanker masters and officers take training, yes.

Mr. **Torricelli**. Initial training or is there —

Dr. **Guest**. Initial training and recurrent training.

Mr. **Torricelli**. Dealing with emergency scenarios as well?

Dr. **Guest**. Yes.

Mr. **Torricelli**. Is the insurance industry not pressuring these companies to engage in more of this similar training?

Dr. **Guest**. Insurance industry basically looks at the actuarial tables, at casualties, and they base their premium on that. They really — they talk about training, they would like to see training, but they don't really give a break to the companies for doing training.

Mr. **Torricelli**. Are you — is it your position that as a matter of licensor that the government should require these captains to also engage in a certain amount of simulator training?

Dr. **Guest**. Yes, we had Captain Warren Leeback who is the maritime administrator state at one point that he thought that periodic refresher training and proficiency testing of the holders of maritime licenses should go on and at a period of about 30 months cycle — you get your license as it was a U.S. Coast Guard license for a period of five years, sixty months, so you could have a proficiency test or proficiency demonstration before you get that license, during the center and at the end.

Mr. **Torricelli**. The Air Force wouldn't have a pilot, the Army wouldn't have a tank commander, and we wouldn't have a nuclear power plant operator who did not spend time on a simulator because you can fly an airplane your entire life and never encounter certain emergencies that will occur on a simulator, so the fact that a person performs their duties does not mean, after years of service that they are prepared to deal with certain emergencies. That is the whole argument for simulators. But, what is amazing about it is that in all these different fields of endeavor, if we would require that simulator — we would have someone enter our largest harbors with millions of gallons of oil with all of the potential danger that it involves and they wouldn't have shared in the same experience. But, in any case, those major oil companies today of their own accord are requiring it?

Dr. **Guest**. They require it not all of them require a demonstration of proficiency by their ship masters or their mates.

Mr. TORRICELLI. But the captains, are the captains doing it on an annual basis?

Dr. GUEST. No, the most frequent is once every three years but the point I would like to make is that the most important thing is not just a simulator training but it is that someone who is issuing the right to pilot these ships is being shown, that is, some regulatory agency is being shown, demonstrated that the person who is doing the piloting has the proficiency to do it, rather than just by experience.

Mr. TORRICELLI. One thing that has come through this is that for all of the failures of technology, we are still left with the reality that 90 percent of all the accidents were from human error — we can do everything possible to improve the technology, but in the final analysis, ensuring that the proper people with the right, temperament and skills or in the pilots analogy is what is required. It is very useful testimony and it gives us a real opportunity to work that into whatever legislative answers we arrive at.

Ms. Sankovitch, I only want to say because I didn't get a chance to ask you questions yet but I am particularly pleased that you are here because one of my frustrations with the environmental community has been the focus on the punishment of those who have caused environmental problems, rather than an equal regard for the technologies that can avoid the problems. As we have seen from the Exxon Valdez, in the final analysis, it doesn't make any difference how much money is available or effort is expended. Once an oil spill of that magnitude occurs, nothing is possible to correct it. And that is why my frustration that is going on in the Congress and in the State Legislatures, they seem to believe that some level of fines will solve the problems of oil spills. No amount of money is going to bring the Alaskan landscape back to its pristine state, and the same will be true of the Port of New York. If we have an oil spill of that magnitude, no amount of money or effort or regulations or fines or jail terms is going to save this harbor. Finally, it has got to be technology. It has got to be double bottoms, double hull, it has got to be the proper navigation systems, it has got to be the right personnel, and somehow together, we have to get the environmental community to understand that as well. It has not happened to do.

Ms. SANKOVITCH. Let me just add that we don't need an Exxon Valdez type spill to cause serious damage to New York Harbor. Spills occur every day and the cumulative —

Mr. TORRICELLI. The damage is being done.

Ms. SANKOVITCH. — effect is very serous.

Mr. TORRICELLI. And the problem is they are not grabbing the headlines to motivate the public or public officials. Part of my frustration in reading the local newspapers, as I said in my opening statement, local newspapers are presenting these accidents as if there is inevitability to them and as if there is nothing in particular that could be done other than levying fines. That just simply isn't the case. I keep — the national press is focusing on this debate in the Congress over the levels of fines, who should be fined, who should be responsible, while the negotiators have now eliminated barge traffic, so that barges aren't going to have double bottoms, double bottoms are out and only double hulls are required, it is going to be twenty years. Some of this from the same people who are lamenting how terrible it is that all of these accidents are occurring. It really is outrageous.

Ms. SANKOVITCH. Well, NRDC believes that one benefit with fines is that you make spills more expensive than prevention. Once prevention becomes something the industry sees is actually less expensive than cleaning up, then hopefully they would spend more money on preventing spills.

Mr. TORRICELLI. Hopefully, but you are still — you can never assume that rational economic judgments are made in corporations. If that were the case, we have talked today about electronic equipment that can be put on the bridge of a ship for a fraction of its operating expenditures. We were talking about simulators that anyone facing this kind of liability, this potential of damage would want their captains, mates, masters to be involved with, but they are not. That is why we make laws.

I thank you each for your testimony. This has been a very helpful session. It is the intention of the Committee to both monitor and receive, work the federal agencies are undertaking to upgrade these systems, to watch the implementation in each of our major ports, but obviously there is also an interest in moving the technology further, commanding improvements in design and ensuring the proper federal research is available to design improved systems, have them implemented and my personal intention to design legislation in this Congress for implementation that would achieve many of the things that we have talked about today.

Thank you for your testimony. Thank you for those who have attended today. The Committee is recessed.

[Whereupon the hearing was closed at the call of the chair.]

APPENDIX

STATEMENT BY THE HONORABLE D. FRENCH SLAUGHTER, JR.
BEFORE THE HOUSE SUBCOMMITTEE ON TRANSPORTATION, AVIATION AND MATERIALS RE: VESSEL TRAFFIC CONTROL TECHNOLOGY
JULY 30, 1990 HEARING

MR. CHAIRMAN, I COMMEND YOU FOR YOUR FORESIGHT AND INTEREST IN CONVENING A HEARING ON VESSEL TRAFFIC CONTROL TECHNOLOGIES. NEWS OF RECENT OIL TANKER ACCIDENTS NECESSARILY FOCUSES NATIONAL ATTENTION ON THE IMPORTANCE OF BALANCING AMERICA'S ENERGY SECURITY WITH PROTECTION OF FRAGILE ENVIRONMENTAL RESOURCES. DESPITE THE DIFFICULTLY OF MAINTAINING THIS PRECARIOUS BALANCE, WE MUST BEGIN THE EXAMINE WAYS TO MORE SAFELY TRANSPORT OIL AND OTHER ENERGY SOURCES.

AN IMPORTANT TECHNOLOGY THAT CAN BE USED TO MAKE PASSAGE SAFER IS A VESSEL TRACKING SYSTEM. I AM PLEASED THAT THE HEARING CONVENED TODAY WILL EXAMINE THE VARIOUS MEANS TO PROVIDE REAL TIME MANAGEMENT OF VESSEL TRAFFIC, INCLUDING THE SYSTEM ALREADY IN USE BY THE U.S. COAST GUARD. WIDESPREAD USE OF THESE SYSTEMS BY INDUSTRY WOULD UNDOUBTEDLY IMPROVE VESSEL SAFETY BY GIVING SHIP CAPTAINS MORE TIME FOR WARNINGS AND CORRECTIVE ACTION TO AVOID COLLISIONS AND GROUNDINGS.

AFTER RECEIVING TESTIMONY TODAY ON THE EFFECTIVENESS OF CURRENT HARBOUR MANAGEMENT PRACTICES AND THE POSSIBILITIES FOR IMPROVEMENT THROUGH NEW TECHNOLOGY, I AM HOPEFUL THAT THE HOUSE COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY WILL BE ABLE TO AFFECT OR ENCOURAGE THE DEVELOPMENT AND USE OF THESE SYSTEMS. IT IS IMPERATIVE THAT WE MEET THE ENERGY DEMANDS OF OUR SOCIETY IN THE MOST ENVIRONMENTALLY SOUND MANNER AVAILABLE.

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ALAN BRODER
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Consultant Engineer
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August 7, 1990

Mr. Todd Baskin
Transportation, Aviation and Materials Subcommittee
2321 Rayburn Office Building
Washington, DC
20515

Dear Mr. Baskin:

The attached document is submitted in response to your request of August 6.

Sincerely,

Alan Broder
Alan Broder

ALAN BRODER Licensed N.Y. State Professional Engineer
Consultant Engineer 108 Corey Lane, East Meadow, N.Y. 11554 • (516) 579-3795

Submitted to
Committee on Science, Space, and Technology
Subcommittee on Transportation, Aviation, and Materials

World Trade Center, New York City, July 30, 1990

I would like to thank the Subcommittee for the opportunity to submit this material on the important question of funding the operation of Vessel Traffic Services.

I am concerned with the contribution that Vessel Traffic Services can make to marine safety. and I am submitting this document to bring attention to an approach that can significantly enhance the use of Vessel Traffic Systems. I am a licensed Professional Engineer in the State of New York and practice as a consulting engineer. Twelve years ago I developed significant parts of the system design that went into the modern Rotterdam system and I am currently involved in defining technical elements of the VTS of the next decade.

The most severe problem in sustaining VTS operations in all of the waterways where they are needed appears to be the cost of operation, in spite of the fact that they are overwhelmingly cost effective to the parties that must bear the cost of clean up after accidents.

Statistical cost analyses of the VTS avoidable accident rate before and after the operation of the New Orleans VTS was terminated show a payback ratio, (avoidable accident cost per month divided by monthly operational cost of VTS) of very nearly 8/1. And it is true that at Valdez a very lightly manned Vessel Traffic Center was in fact unmanned several minutes after the Exxon Valdez called the VTC to announce it was leaving the outbound lane of the Traffic Separation Scheme to cross into the inbound lane. Exxon Valdez was expected to line up (outbound) on the inbound lane of TSS. No operator was at the console in the VTC to notice that Exxon Valdez reported no course change in time to avoid passing across the inbound lane into shoal water.

From the data mentioned above it is apparent that private funding for the operation of the systems would be an excellent investment for marine carriers and marine underwriters. Should we not have legislation to attract such funding? Legislation must thoroughly protect the contributing companies from liability claims against consequences of VTS operation, and guarantee that no diversion of the funds could take place.

I have approached the United States Congress Subcommittee on Coast Guard and Navigation with some concepts for funding the cost of VTS operations. The Subcommittee Counsel pointed out that any action towards such legislation could only take place after inquiries from potential contributors had been received.

Therefore I propose that potential funding sources be approached with the following question: What sort of legislation could make this course of action attractive? As you are certainly aware the cutback in funding for the Coast Guard has severely affected VTS operations in this country. Contributory funding from underwriters and carriers could be used to improve existing systems, or ensure operational funding for future systems. Selection of actual use would be made by the contributor.

Potential contributors should be asked if they would consider partial or total funding of a VTS if appropriate legislation were passed, and what would that legislation have to entail?

a) What hold harmless statements, and

b) What guarantees of non-diversion, and

c) What tax break arrangements, and

d) What control would they require in establishing the operational procedures of the VTS?

e) Are there other considerations to be addressed?

I envision such an arrangement funding only the operation of the VTS, not its construction. The manning and day to day operation of the VTS would be in the hands of the government, through the US Coast Guard.

I have been in contact with Lloyd's Underwriters Association, of Lloyd's of London, and have been advised that their Joint Hull Committee is considering my suggestions. The Joint Hull Committee is a body which represents the interest of hull underwriters operating in the whole of the London Marine Insurance Market, both Lloyd's and Insurance Companies.

Legislation for capping liability for cargo spills, now under consideration in Congress, or the no-limit liability policy of several coastal states holds particular interest for consideration of private funding for VTS operation. Should the federal and state governments tie liability limits to requirements for VTS funding? I think so.

Respectfully submitted,

Alan Broder

Alan Broder, July 30, 1990

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Consultant Engineer
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Submitted to Congressman Robert G. Toricelli, Democrat, N.J.
for inclusion in Conference minutes.

World Trade Center, New York City, July 30, 1990

Congressman Torricelli:

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WILD GOOSE ASSOCIATION - The International Loran-C Forum

STATEMENT ON ENVIRONMENTAL CONCERN AND THE ROLE OF LORAN-C IN THE VESSEL TRAFFIC SERVICE (VTS)

There are many environmental and economic consequences of a vessel collision or grounding in U.S. waters. Exxon Valdez represents one extreme and the U.S. public is becoming more and more sophisticated in its knowledge and concern for what is being carried in and out of U.S. Ports and the effects a collision or grounding might have on their well being. There have been numerous minor oil spills and other incidents since Exxon Valdez to remind us of the potential for another major incident. How many of these incidents could have been prevented by a VTS is subject to considerable debate but this does not dismiss the need for examining maritime traffic in U.S. Ports and assessing the role traffic management systems would have in reducing or preventing such incidents in the future. Another factor that msut be included in the equation is the impact of VTS on after casualty or after action situations. The speed with which the public is notified, other vessel traffic is warned and response to a casualty is initiated would be vastly improved with a VTS that is monitoring, and managing vessel traffic. This factor alone could have enormous impact on the costs of cleaning up a large oil spill or reacting to a hazardous or toxic release in a heavily populated community.

The Port and Tanker Safety Act of 1974 was enacted to provide a certain measure of protection against the current oil spill problem. Obviously this law has not been successful in preventing these tragedies and unfortunately is found to contain a number of inconsistencies. For instance, vessels in excess of 1600 gross tons, entering the Coastal Confluence Zone (CCZ) are required to carry a LORAN-C or TRANSIT navigation receiver. LORAN-C provides accurate, continuous position information to the mariner on a real time basis and there are several hundred thousand vessels equipped with LORAN-C in the United States alone. However, many vessel operators have elected to install Transit radionavigation equipment in lieu of LORAN-C because of its worldwide coverage - LORAN-C coverage extends primarily to the U.S. Coastal Confluence Zone (CCZ). Due to the long waiting periods between satellite passes (Transit) it is possible to sail through certain portions of the CCZ without ever having a position fix. The Department of Defense satellite based Global Positioning System will eliminate this satellite coverage problem and provide continuous coverage when the system is operational in 1993. For security reasons, GPS signals provided to the civil community will be intentionally degraded to a level of accuracy less than LORAN-C's repeatable accuracy. Civilian users also will have little say in how this military system is operated. For these reasons it is expected that mariners will not replace Loran-C with GPS in the immediate future. The great number of LORAN-C receivers in use today provides an immediate opportunity for enhancing the VTS.

The Vessel Traffic Service (VTS) has not had adequate support from the government over its lifetime and is sometimes looked at as a hindrance rather than a safety service by the mariner. For instance, a tanker nearly collided with a ferry boat in Puget Sound when the VTS was unable to communicate with the ferry boat which had secured its radio. It is now time to examine this situation using a systems approach, rather than reaching partial solutions. Personnel resources have been reduced in the U.S. Coast Guard Vessel Traffic Service (VTS) program during budget cuts. Sensor and traffic management systems have not been improved to increase efficiency and reduce labor intensive functions at a VTS. Radio communication augmented with sensors and voluntary position reporting has formed the backbone of existing U.S. vessel traffic systems. The failure of one or more of these at critical times has been the reason for collisions and near misses in the waterways. New sensor, radionavigation and communications technologies must be examined in a systems approach analysis of U.S. vessel traffic service requirements. VTS's must include modern command and control capability with minimum disruption and interference to maritime commerce, provide the degree of vessel management necessary to minimize maritime incidents and improve safety with the least number of people involved in performing this service.

The Wild Goose Association believes strongly that our existing national radionavigation assets must be fully exploited toward improving vessel traffic safety and management in our U.S. Ports. It is only logical that the LORAN-C technology that is currently being used in aviation and land transportation application be applied to manage vessel traffic in the U.S. CCZ and in approaches to U.S. Ports. In many busy ports, there is a queuing problem due to berthing space, insufficient anchorages or lay-berths, and channel access restrictions (one-way traffic). Effective traffic management must consider vessel traffic coming into the queue from outside the normal range of radar surveillance. Some means of detection, identification and tracking must be implemented. While vessel traffic is proceeding between ports, and elsewhere in U.S. waters, surveillance is needed to insure that safety rules and regulations are being followed and that vessels are keeping safe distances from known hazards whether it be shoal water or offshore platforms. Radar surveillance of all these areas would be too costly and an automatic dependent tracking system on each vessel of concern would be the only cost effective solution.

Dependent Automatic Tracking Systems (DATS), used for vessels or Automatic Dependent Surveillance Systems (ADS), used for aircraft have been in general use for some time. Low cost communications links and/or utilization of existing communications services has been instrumental in the development of successful dependent surveillance systems. On land, commercial carriers are being tracked in real time as they proceed across country. Traffic managers are able to make better use of resources and to simplify their accounting as cargos move from city to city. Emergency services vehicles in a number of major U.S. citios are currently utilizing LORAN-C based dependent surveillance systems to dispatch police cars, fire vehicles and ambulances. This has reduced the need to communicate unnecessarily, improved dispatching and reduced the overall cost of operating these vehicles. Dependent surveillance is used in a number of aviation applications including the tracking of helicopters serving the offshore industry. Again, LORAN-C is the navigation sensor used in all these systems. LORAN-C coverage is provided for all U.S. CCZ waters and approaches to major Ports. Most of these areas are beyond the reach of existing or planned radar systems and there is not more cost effective means to track the location of vessels in these areas than with automatic dependent surveillance or tracking systems.

The Electronic Chart Display and Information System, (ECDIS) is rapidly becoming part the navigational suite aboard many vessels. When the electronic chart is an overlay on the ship's radar the radar becomes easier to interpret and provides much more information can be provided through an ECDIS than can be portrayed on a chart. Much work is being accomplished at the International Maritime Organization (IMO) and the International Hydrographic Organization (IHO) to develop standards for these systems. The electronic chart becomes an even more useful tool when both the VTS and the vessel are using the same display. Again communication links can be used to transfer the ships position as it appears on the ship's ECDIS to a display system within the VTS. There is probably no better way to achieve interoperability between the VTS, the vessels and its surroundings. Data from the ECDIS also can be recorded and stored for later investigation in case of an accident, similarly to the way an airliner's "Black Box" is used. ECDIS requires a accurate navigation sensor to overlay the radar display with chart information. Loran-C provides an excellent means of performing this function.

The Wild Goose Association takes great pride in representing the users, manufacturers, engineers, scientists and government officials worldwide engaged in the operation, use, improvement and application of the LORAN-C radionavigation system. LORAN-C is currently undergoing planned expansion in Europe and represents the U.S.'s most cost effective terrestrial radionavigation asset. Since LORAN-C was implemented in the U.S. CCZ because of tanker traffic concerns, it is only appropriate that it continue to be employed in the efficient tracking and management of offshore vessel traffic.

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